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SOME FURTHER OBSERVATIONS UPON CONTAMINATION OF OPERATIVE WOUNDS BY AIR-BORNE BACTERIA*

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THERE is nothing new about air-borne infections, but at this time when architecture is developing a new type of construction based on new methods of treating and controlling the air supply, the moment seems auspicious for a new emphasis upon what has been shown to be a chief cause of postoperative morbidity, and occasionally of fatalities.

At last year's meeting I took occasion to exhibit a culture made by exposing a blood agar plate in the operating room at Worcester City Hospital during the progress of a laparotomy requiring an hour's time. You may recall that the medium was thickly sprinkled with yellow and white colonies of staphylococci and one typical colony of the hemolytic streptococcus. At that time, lest some should assume that operating room conditions were much worse at the source of that culture than elsewhere, I invited any who harbored that idea to repeat the experiment for themselves. Two members were interested enough to act upon the suggestion, and reported results quite similar in character and supporting the general thesis that in the average operating room a large number of living, pyogenic bacteria are present in the air, and can be readily shown to settle therefrom upon whatever will catch and retain them. It seems obvious enough that an operative wound of average size will not only catch as many as does the Petri dish by direct sedimentation, but must also receive many which are carried in on gauzes, hands and instruments upon which they have also been settling.

In order, however, that this point might not rest on pure assumption, observations were carried out upon twenty-eight routine operative cases by my colleague on the West Service, Dr. Wm. E. Denning; by my assistant, Dr. J. F. Curran, and by me, in the following manner. The length of incision and time of operation were noted. After the peritoneum was closed ten cc. of sterile salt solution was squirted into the wound in such a manner as to wash over the cut surfaces and was then sucked back into the syringe, put into a sterile test tube and sent to the laboratory where one cc. was added to a tube of melted agar and poured into plates, incubated, and the colonies counted and identified.

The cultures were negative in but three instances; in one gastro-enterostomy in which the sides of the wound were protected by sewn-in towels, and in one appendectomy there were but ten colonies; in the other twenty-three the counts ranged from 50 to 1680, with four instances reported as "too numerous to count".

All the wounds were washed out with one per cent neutral acriflavine solution just before completing the sewing so that the relation of the healing to the bacterial count cannot be deduced. Eighteen healed by first intention without any discharge at all, nine are recorded as having slight and one as moderate discharge. One herniorrhaphy having a count of 1680 and a slight discharge developed mild femoral thrombophlebitis. There were no fatalities in the hospital. One patient succumbed from recurrent malignant disease after discharge from the hospital.

Dr. Denning varied the plan in six cases by taking a second culture after washing out with neutral acriflavine. The culture in every case but one showed a marked reduction in number of colonies and all but one healed without discharge, a ratio of 6-1 as against 2-1 for the group, but as all received the acriflavine treatment before closing, no importance can be ascribed to that difference.

The primary purpose of the study, namely to determine whether the air-borne organisms would be recovered from the wounds, was answered emphatically in the affirmative. That thirty-three per cent of these wounds, mostly those having high counts, should have defective healing, would not seem to be a coincidence, although it may perhaps be equally fair to suspect that it was due to the acriflavine. To this I can only answer that routine use of it for many months has not seemed to vitiate wound healing and has apparently been a factor in lowering the incidence of severe infections.

I mentioned that I am indebted to two other members of this Society for coöperation by making similar observations in their respective hospitals. Dr. Allan Rice reported thirty colonies obtained in an hour's exposure in one of the

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operating-rooms of the new Springfield Hospital.

Dr. Donald S. Adams sends the following report from another Worcester Hospital:

"*Dear Dr. Hunt:*

I am enclosing Dr. Elliott's report to me on his findings in the operating-room, carrying out your suggestions.

100 m.m. blood plate exposed in operating-room for one hour, then incubated for 36 hours.

10/11/32—86 colonies (very busy day in oper. room)
10/12/32—76 "
10/13/32—78 "

Smears were made from all colonies on third day.

14 colonies yeast
42 " Staph. Albus
12 " Orange and Yellow Staph.
5 " Large Gram plus bacilli
5 " minute non-hemolytic (non-hemo. Strep.)

As you know, our Surgery is of the old-fashioned type, poorly ventilated. There is no means of air filtration; suction carries off the old air by means of fans in the air shafts. There is no direct ventilation. The floors are kept very clean, scrubbed each day and frequently after each operation. Once a month an electric scrubber is used.

Let me know if I can help you in any way for I consider this a very interesting experiment."

And then from the literature I find that Dr. Truesdale, as always one step ahead of the pack, in 1924 devised a canopy for his sterile goods table to protect them from bacterial sedimentation and in proof of its effectiveness published photographs of two plate cultures after five minutes' exposure, one from under the canopy showing but two colonies and the other from above the canopy showing "too many to count" if I may judge from the reproduction. (I trust he will correct me if I am wrong.)

Seeking comparison with a hospital having the latest and best in design, equipment including air filtration and technical control of the operating rooms, I turned to Dr. Frank L. Meleney of the New York Presbyterian Hospital. Dr. Meleney's contributions to the literature of surgical technic and surgical bacteriology are most noteworthy, as all who have read his section in Nelson's Surgery will agree. From him I received the following information.

"We have a filtration system for the air in the operating room and some time ago I tested the filtration. At that time, we were using oil soaked filters and I found that when they became dirty they were not very effective. We, therefore, changed over to the felt pad filters which have proven to be more effective. I believe that this is an important factor, but not the only factor in the air contamination in the operating room. As you know, we have our operating rooms on the fifteenth and sixteenth floors; this of itself purifies the air and minimizes the street dust contamination, and the air filtration further diminishes the number of bacteria and the number of dust particles, but there is still contamination from the opening and closing of doors and from the dried germs brought in on the feet of those in the operating room. The operators use rubber soled shoes which are only used in the operating room, but the nurses use shoes which may bring contamination from the outside. The visitors are required to use the balconies. The balconies are screened with plate glass. In spite of this there is still some contamination which is shown by plates which are exposed in the operating room. To minimize the air contamination still further, we have recently adopted the use of canopies over all sterile tables. I have advocated one more precaution but so far it has not seemed practical; that is, the use of clean duck overshoes for anyone entering the operating room. Of course it is impossible for anyone to prevent air contamination, but I feel that we have done everything that is practical in adopting the measures that we have. Of course, as you know, we insist on the masking of the nose and mouth, not only of the operating team, but of the anesthetist and orderlies and everyone entering the operating room.

"I have made some new studies of the air contamination in the operating room with one or two extra features which seem to me to be significant.

"I cultured the air outside of our air filter. It was a damp day so that the number of bacteria was probably less than it would be ordinarily. It showed an average of .46 colonies per minute of exposure (27.6 on hourly basis*). Inside the filter this was reduced to .13 (7.8 on hourly basis) so that it is evident that our filters are not completely efficient. It is almost time to change the pads. Plates exposed in one of the air-conditioned operating rooms in which no operating was going on yielded .09 colonies per minute (5.4 on hourly basis*). In an air-conditioned operating room in which operating was going on and there was constant moving in the room there was a yield of .8 colonies per minute (48 on hourly basis*). It was not possible to find a room of the same size in which the air was not filtered, but in another room considerably smaller but in which there was no motion and no opening and closing of doors there was a yield of .13 per minute (7.8 on hourly basis*).

"I think that these figures bear out my former statement that the air conditioning, at least in our hospital with the operating rooms on the fifteenth and sixteenth floors, is not of paramount importance, but the opening and closing of doors and the entrance and moving about of people is of very great importance. If, however,

*The conversion to hourly basis is mine to compare with the exposures made elsewhere.

the operating room is nearer the street, it is quite possible that the air conditioning apparatus would be very much more important."

From these statements it is clear that present day air control falls short of its seeming possibilities because room design and personnel control have not caught up with it. With doors and windows to let in unfiltered air, nurses and doctors bringing in dirt from outside, there is little possibility of realizing much on an investment in such equipment.

There is considerable literature upon the subject of wound contamination and wound healing and from it and from my own experience I derive the opinion that ten per cent expresses very conservatively the morbidity from operative wound infection under average standards of technic and equipment at the present time. I know that there are operators and hospitals who stand far above the average in this respect. I believe Dr. Cushing has attained practically one hundred per cent aseptic healing in his special field and have no doubt that those who follow in his footsteps may do as well.

Fortunately the majority of wound infections are mild and superficial, adding but a few days to the patient's hospitalization, but about once in two or three thousand cases there occurs accidental virulent infection which moves rapidly to a fatal termination. It is my belief that the mild ones are generally from the dried and light attenuated bacteria which float in the air day in and day out, while the severe ones are from air contamination as by some member of the operating room force or spectator who has a sore throat or an upper respiratory infection and ejects infectious material by coughing, sneezing or clearing the throat, etc.

There would be little point in presenting this picture unless one were prepared to suggest a way out. Dr. Meleney in his letter uses the words "I feel that we have done everything that is *practical* in adopting the measures that we have." It is upon the conception of what is practical in different institutions, professional groups and surroundings that success in limiting wound infection lies. Unfortunately it is not always the surgeon's conception which dominates the situation. Given a surgeon possessed of an iron will and an eminence which compels coöperation from colleagues, trustees, administration and nurses, or a gracious personality which enthuses others, precautions can become nearly one hundred per cent effective. We all know what these precautions should be, but the general effectiveness of application leaves much to be desired.

The human factors in present-day hospital work being what they are, and progress in other sciences which bear upon hospital possibilities having been so noteworthy, it seems possible to evolve a new type of operating room, which though different, does not seem to me to be impractical. I foresee this evolution resulting in something like this: Located upon the top floor there is a room oval in shape, about twelve to sixteen feet floor with dome-like ceiling not too high, absolutely smooth on the inside with no square corners, lined with monel metal or similar rust and tarnish proof alloy, having no windows, but two doors which fit flush with the interior surface, ports similarly fitted as to the wall, but having viewing sections of pyrex or other heat resisting glass, and of such size and number as will permit trays of instruments, readily sterilized and arranged to be passed in as needed. There is no furniture in the room except when the operations are going on and then only the necessary things. There are no shelves or brackets, lights are ensconced and accessible only from behind the protecting glass. Switch controls and electric outlets are waterproofed. There is no passing in and out of attendants or spectators. If there is a gallery it is behind glass, and the operator's words are transmitted by electrical devices to spectators in the gallery and aides in the adjoining room. The atmosphere is controlled by conditioning and filtration, which is effective because no air is admitted except through the apparatus. At suitable locations in the wall are pipes from which jets of water may be directed so as to flush every bit of the wall and dome at such intervals and temperatures as experience finds suitable.

All set-ups are prepared and slid in from an adjoining room of somewhat similar construction and atmospheric control, and the personnel in the operating room is limited to those actually needed. Anesthesias are induced in a side room. Faces and heads of personnel are protected by masks which do not obstruct vision, are ventilated at the sides, but impervious in front of the nose and mouth. No article of clothing is worn into the operating room which comes from the outside. The temperature and humidity are so accurately controlled that the patient has no need for blankets which hold dust, the parts of the body not in the operating field being comfortably clad in sweat-absorbing and close-fitting garments which do not rumple or slide out of place. Tables and furniture are of lighter material than are now in vogue and constructed to avoid all dust lodgments, are easily cleaned, and wheel smoothly and quietly.

Beyond the more efficient mask, the operating team is gloved and gowned as at present but these are donned in the side room. The members of the team are more comfortable than in our superheated rooms of today.

Perhaps, gentlemen, this portrayal seems a bit fanciful. If so, I commend it to your reflections if and when another patient dies of accidental wound infection. To quote Meleney again in closing, "As long as surgical infections exist, surgeons must make never ending efforts to control them and to prevent their occurrence by every means available. The goal is not yet in sight, but we know what it is and we believe it to be attainable. It may be described as a time when medical science and art can absolutely prevent bacteria from gaining a foothold in the human body."

CHRONIC HEREDITARY EDEMA (MILROY'S DISEASE)*

Its Clinical Aspects and the Nature of Its Production

BY LAURENCE B. ELLIS, M.D.,† AND FRANCIS C. HALL, M.D.†

PATIENTS presenting edema of the extremities as an outstanding sign are common. The cause of such edema is usually easily recognizable either as a systemic disease, such as cardiac failure, protein deficiency or nephritis, or as a local disturbance from lymphangitis, varicose veins, or phlebitis. Occasionally, however, no obvious reason for the edema is detectable since there are no other clinical symptoms or signs and routine laboratory studies are negative.

Among the rarer types of chronic peripheral edema is the condition called Milroy's disease. This has also been known as Meige's or Nonne's disease and as chronic hereditary edema or trophedema. The first description of this condition was published by Nonne[1] in 1891 who observed four individuals in two generations of one family who had suffered since birth from swelling of one or both legs and feet. Nonne traced five further cases among near relatives. The first account of this disease in the English language was by Milroy[2], a year later, who reported 22 cases of it in six generations of a single family comprising 97 members. As he described it this edema was hereditary, persistent, confined to the lower extremities, and unaccompanied by other symptoms. In nearly all of his cases the abnormality was present at birth. The benign nature of this condition is illustrated by the result of a follow-up report by Milroy in 1928[3], 36 years after his original description, in which he stated that none of the patients had been seriously incapacitated or had died from anything directly or indirectly associated with the edema. Milroy thought that this edema was probably related in its origin to the vasomotor neuroses.

Hope and French[4] investigated 42 members of another family, 13 of whom suffered from chronic edema of the lower extremities. They pointed out the frequency with which their patients developed "acute attacks", simulating lymphangitis or cellulitis but which always rapidly subsided. The onset of the edema in these persons occurred at varying ages.

Meige[5] in 1899 described a variety of chronic edema which in many respects was similar to that reported by Milroy. He called this condition "chronic hereditary trophedema" and described it as follows: "Chronic trophedema is characterized by a firm, pale, painless edema, segmentary in distribution over one or both lower extremities and persisting throughout life without any particular interference with health. Trophedema occasionally occurs in isolated cases; at other times it is hereditary and familial. It seems that it can be also congenital." Subsequently numerous observers have reported cases of "trophedema" which probably have been due to diverse etiological causes. Some of these cases have been associated with abnormal secretion of the thyroid or other endocrine glands, with psychoneurotic and hysterical states or with abnormalities of the vasomotor system; others have followed infections or local injuries. Although there is no general agreement as to the etiology of trophedema, even among those who have limited their definition to cases which have fulfilled the description of Meige, the most generally held theory among French clinicians is that it may be due to trophic disturbances in the subcutaneous tissues, secondary to abnormalities in the autonomic nervous system or the endocrine secretions. In the English and American literature, the most commonly expressed hypothesis is that of an interference with lymphatic drainage.

In spite of the many clinical descriptions of cases of edema of this nature, there has been relatively little investigative work reported which has shed light on the nature of the disturbed physiology. The following report of four cases of chronic edema in three generations of a single family is made to re-emphasize the existence of this clinical condition and to present the studies which were carried out in one of the cases.

REPORT OF CASES

First Generation

The family is of native American stock. No information was obtainable as to whether the edema had occurred prior to the first generation here reported. This is a woman (L. J.) now 77 years of age, who developed a "milk leg" at the age of 26 following childbirth. Some months later the swelling spread to the other leg, and has persisted in both legs to the present without seriously inconveniencing the patient whose health has otherwise been excellent. The edema tends to subside on rest in bed and is largely controlled by elastic stockings. This person was not seen by the authors. The information regarding her was furnished by her daughter. L. J. has four brothers and one sister who are living and well without edema. One sister died at the age of 60 of "kidney trouble"; she had "dropsy" for a short time before her death. One sister died at 30 of tuberculosis.

Second Generation

L. J. has three children. Two of these, a brother and sister are quite well and normal. The third (J. H.) is a woman of 46 who developed swelling of

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both legs during her second pregnancy, 19 years ago. This gradually increased over a period of nine years, although it was not particularly affected by her two succeeding pregnancies. For the past 10 years it has been stationary. It has never extended above the knees. Ten years ago within a year she had three "acute attacks" which were characterized by "blisters" appearing on the *left* foot which lasted four or five days, and were followed by a chill, fever and general prostration at which time the *right* lower leg became very red, sore and tender. In four to five days the symptoms disappeared. Since that time her right leg has remained slightly red and tender above the ankle. The edema tends to subside during the night and is largely controlled by bandaging. The patient's health has otherwise been excellent, and there are no other symptoms.

Physical examination on February 23, 1933, revealed a well-developed, healthy looking woman with a tendency to easy blushing. Except for the lower extremities the examination was normal. The blood pressure was 150 mm. Hg. systolic and 80 diastolic. The legs showed moderately extensive, firm, slightly pitting edema extending to the knees. There were no varicosities and the dorsalis pedis pulsations on both sides were present. The skin was warm and just above the ankles, especially on the right, it was reddened, scaling, somewhat indurated, and slightly tender to the touch, resembling varicose eczema.

Examination of the urine for albumin, sugar and abnormal cellular elements was negative. The total plasma proteins were 6.3 per cent.

Third Generation

J. H. has four children. The oldest, a boy 22 years of age, is normal. The second is a girl 19 years old who has shown marked vasomotor instability. The report of the third (W. H.) will be presented last. The youngest (R. H.) is a boy of 14 who is quite well and normal in every way, except that for the past year there has been some swelling of both legs to the knees. This edema has never been marked enough to require bandaging and subsides on rest in bed.

The physical examination on February 23, 1933 of this boy was quite negative except for his legs. He was well-developed for his age. His blood pressure was 118 mm. Hg. systolic and 60 diastolic. Both lower extremities showed slight but definite pitting edema of the feet and legs extending up to the mid-calf. There were no varicosities; the skin was warm and normal in appearance and both dorsalis pedis arteries were felt to pulsate. Examination of the urine was completely negative and his total plasma proteins were 6.4 per cent.

The fourth patient, W. H., brother of R. H., is an American schoolboy, aged 16, who first developed swelling of the legs and feet three years ago. The onset of the swelling was insidious without previous infection or trauma and the edema has gradually grown worse, being more extensive in the evening than in the morning. The swelling is of about the same degree in both legs, extending to the knees. On a few occasions the patient's mother noted questionable edema around his eyes and he thought that his hands had been swollen at times. Otherwise there have been no other symptoms whatsoever. He has had nothing resembling phlebitis or lymphangitis and no complaints referable to his cardiorenal system. He had been studied previously and no albumin was ever found in his urine.

The patient's habits are normal. He is a third year student at high school, and indulges actively in sports. His diet has been quite normal, containing adequate amounts of protein and vitamins.

His past history is unremarkable. He was born with six toes on each foot and a sixth finger on one hand, the latter being removed in infancy. This anomaly was inherited from the paternal side of the family. Seven years ago he developed severe transient edema of the face and mouth following the second of a series of injections of diphtheria toxin-antitoxin. He had a very questionable and mild attack of diphtheria four years ago, for which no antitoxin was given. There is no history of sore throat, scarlet fever, rheumatic infection, eczema, urticaria, hay fever or asthma. There has been no dyspnea, orthopnea, cough, polyuria, dysuria, nocturia, or hematuria.

Physical examination on June 24, 1932, was essentially negative except for the edema. He was well-developed for his age, rather pasty looking, with puffiness under the eyes. The head, mouth, and throat were unremarkable. The lungs were clear.

FIGURE 1. Photograph of lower legs of W. H. showing edema.

The heart was not enlarged. There was a rather forceful impulse and a soft blowing apical systolic murmur not transmitted. The initial blood pressure was 165 mm. Hg. systolic and 55 diastolic. This elevation was probably due to nervousness as subsequent readings were about 125 mm. Hg. systolic and 60 diastolic. The abdomen was negative and the reflexes normal. There were six toes on each foot. There was extensive edema of both feet and legs extending to the knees (fig. 1). This was rather hard, but pitted slightly. No edema of the upper extremities was detectable.

Routine laboratory studies were practically negative. Repeated urine examinations showed the slightest possible trace of albumin on one occasion only, none on the others. There was no sugar. The sediment showed no abnormality except a rare leucocyte. One urine specimen had a specific gravity of 1.029. In a two-hour renal function test the specific gravity varied between 1.013 and 1.023; the day output was 960 cc. and the night output 720 cc. The phenolsulphonphthalein excretion in two hours and ten minutes was 65 per cent.

The blood Wassermann reaction was negative. He had a red blood count of 4,590,000 per cu. mm., a white blood count of 6,350 per cu. mm. and a hemo-

globin of 86 per cent (Sahli). The basal metabolic rate was minus four per cent. An electrocardiogram and a teleoroentgenogram of the heart showed no abnormality.

Laboratory Studies: The special laboratory studies were carried out in December, 1932 as follows:

A blood volume, performed by the dye method[6] was 5.68 liters or 8.5 per cent of the body weight. The plasma volume was 2.41 liters and the hematocrit 42.5 per cent. All of these findings are quite normal.

The venous pressure taken in the recumbent position by the direct method[7] was normal both in the arm and leg. The pressure measured in the left cubital vein was 7.5 cm. of water and in the right femoral vein was 5.0 cm. of water.

The proteins of the blood plasma were estimated on three occasions as follows:

July, 1932, total proteins 6.2%, albumin 3.3%, globulin 2.9%. December 20, 1932, total proteins 6.5%. December 23, 1932, total proteins 6.5%, albumin 4.0%, globulin 2.5%. The protein determinations were performed by the Kjeldahl method on oxalated plasma. The protein fractions were separated by precipitation of the globulin with potassium phosphates. These are all entirely within the normal range.

In order to study the reactions of the minute skin vessels, a small amount of a 1:1000 solution of histamine dihydrochloride was pricked into the skin at varying points on both legs and thighs. The normal reaction in this location to such a procedure is the appearance in three to five minutes of a wheal 0.5 to 1.0 cm. in diameter, which is surrounded by a pink flare about three cm. in diameter, which is often very faint in color. Precisely such a reaction was obtained in the present case.

It is possible to obtain an estimate of the degree of blood flow through a leg by measuring the amount of oxygen present in the femoral venous blood draining that extremity and in the arterial blood. If the blood flow is rapid the difference between the arterial and venous oxygen contents will be slight, if delayed and slow this difference will be large. Table I presents such data in blood obtained from each leg in the horizontal position and from the left femoral vein in the erect posture after the patient had been standing for ten minutes. It will be seen that the blood flow through each leg in the horizontal position was extremely rapid since the oxygen contents of the venous bloods were nearly as high as the arterial. When the patient was upright the blood flow was much slower. This slowing in this position is, however, the usual finding in normal individuals. It is of interest to note the rise in oxygen capacity of the femoral venous blood on assuming the upright position, from 17.0 to 19.1 volumes per cent, an increase of 12 per cent. This increased capacity was undoubtedly due to a concentration of the blood due to a loss of fluid from it into the tissues in the upright position.

To study further the composition of the blood in the upright position when edema was presumably forming, and to compare it with the blood in the horizontal position at which time the edema was being absorbed, further studies were made on the blood taken from the femoral vein in the horizontal position, when the patient had been recumbent for an hour, and again in the erect position after he had been standing ten minutes. The findings are shown in table II. An attempt was made to obtain some of the edema fluid for analysis at the same time. For this purpose Southey tubes were introduced above the ankles in each leg and allowed to drain for four hours. At the end of this time only 3 cc. of fluid had been collected. A protein determination on this showed 0.67 per cent protein. It is possible that there may have been some contamination of the fluid with serum, so that the amount of protein determined may have been higher than was actually present in the edema fluid. It is impossible, however, that it was less. This amount of protein is of the same order of magnitude as that found in the lymph of normal dogs[8], and in human non-inflammatory edema fluids due to varying causes[9, 10]. It is, however, somewhat lower than one might expect in edema caused by lymphatic obstruction[18].

Clinical Course and Treatment: No further edema of the face of W. H. has been noted since the first

TABLE I

THE OXYGEN CONTENTS AND CAPACITIES OF FEMORAL VENOUS AND ARTERIAL BLOOD SAMPLES FROM PATIENT W. H.

Blood from	Position of Patient	Oxygen Capacity	Oxygen Content	Arteriovenous Oxygen Difference
		Vol. %	Vol. %	Vol. %
Left Femoral Vein	Recumbent	17.0	16.3	1.8
Right Femoral Vein	"		15.7	2.4
Left Femoral Vein	Standing	19.1	8.0	10.1
Artery	Recumbent	18.4	18.1	

TABLE II

EFFECT OF POSTURE ON THE COMPOSITION OF BLOOD FROM THE FEMORAL VEIN IN PATIENT W. H.

Blood from Femoral Vein	Position of Patient		Difference per Cent
	Recumbent	Standing	
Serum NaCl in mg./100 cc.	616	609	— 1
Serum Non-Protein Nitrogen in mg./100 cc.	24	28	+17
Total Serum Proteins in per cent	5.6	6.8	+21
Total Serum Solids in per cent	7.91	8.95	+13
Specific Gravity of Serum	1.025	1.028	
Red Blood Cells in millions/cu. mm.	4.53	4.78	+ 6
Hemoglobin in grams/100 cc.	13.1	14.2	+ 8

examination. The edema of the legs in this patient, as in the three preceding cases, is satisfactorily controlled by bandaging with an elastic bandage or stockings. The swelling has persisted in these individuals for 51, 19, 3, and 1 years respectively without evidence of any other disturbance of the patients' health or of changes in the tissues locally. Moreover, it is evident that although the tendency toward edema formation may increase for a period, an equilibrium is usually reached, following which the edema does not tend to become greater. This is especially evident in the first two patients.

W. H. has been treated by various measures other than bandaging without definite success. Potassium chloride in place of sodium chloride in the diet, digitalis in small doses, thyroid extract (Armour's) in one-grain amounts daily, and diuretin all failed to result in improvement. He was given several intramuscular injections of salyrgan which may have caused the edema to decrease, but since during this period he was kept in bed a good deal of the time, it is unjustifiable to ascribe the improvement to the salyrgan alone.

DISCUSSION

The cases which have been reported fit in their essentials the type of condition described by Milroy. All show a chronic edema unaccompanied by other symptoms or signs of local or general disease. Although the onset of the disease was at birth in nearly all of the cases reported by Milroy, in the reports of other writers it has occurred at varying ages. Two of our patients first developed edema at or about puberty and in two its initial appearance was during pregnancy. It is of interest that one of our patients (J. H.) has had three "acute attacks" which have been very similar in their nature to those described by Hope and French as occurring in nearly all of their cases. In three of our patients the swelling has been sharply confined to the lower legs and feet. The fourth, W. H., has shown questionable edema of the face and hands, but this has never been striking in degree. Except for the reaction which W. H. had to diphtheria toxin-antitoxin and the vasomotor instability which his sister shows, there is no history either in our patients, nor in any of their relatives, of disturbances of the endocrine glands or vasomotor system such as Raynaud's disease, urticaria, or angioneurotic edema. The association of trophedema with developmental defects of the skeletal or nervous systems has been repeatedly stressed in the literature. Although our patient, W. H., did have six toes on each foot, it is improbable that this was related in any way to the edema since his polydactylism seems certainly to be a tendency inherited from the paternal side of his family.

Etiology of Edema: There has been little experimental evidence presented in the various reports of this condition to substantiate the etiological theories which have been advanced.

Rietti[11] studied one of four cases which he reported and found an increased serum viscosity with diminished "colloid dispersion", and a relative increase in the globulin fraction of the serum proteins. He believed the probable cause of the edema to be an alteration in the colloidal balance due possibly to abnormalities in endocrine secretion or autonomic nervous system changes. Richards[12] studied the electrolytes of the blood in one patient at a time when the edema was forming and again when it was being absorbed and concluded that there must have been an interference with the normal lymphatic flow in the legs.

Our studies on patient W. H. furnish some further evidence in favor of this latter viewpoint.

Edema of this type might be due to (1) excessive loss of fluid through the blood capillaries as a result of (a) increased hydrostatic pressure; (b) increased permeability of the capillaries; (2) decreased reabsorption of fluid into the blood stream because of lowered plasma osmotic pressure; (3) local changes in the tissues tending to hold the water; (4) decrease in lymphatic drainage.

1a. Increased Capillary Pressure: Increased capillary pressure is usually due to back pressure from the veins either from local obstruction or from the systemically raised venous pressure in heart failure. An abnormally great hydrostatic pressure may, however, be secondary to dilatation of the arterioles which permits more than the usual proportion of the arterial pressure to reach the capillaries. This phenomenon has been noted[13] in the vasomotor paresis which usually accompanies the hemiplegia resulting from a cerebral vascular accident. In such cases some edema may be present over the affected side.

In the patient studied there was no evidence of increased venous pressure, and the very rapid blood flow through the legs precluded a local vascular obstruction of any marked degree. The rapid blood flow suggests that there must have been a considerable degree of relaxation of the arterioles of the lower extremities, and probably some increase in capillary pressure. We believe, however, that this is secondary to the edema rather than the primary cause of it. It in turn, however, tends to aggravate the edema which is already present. Rapid blood flow through edematous extremities has been noted before[14] in cases where the edema has been of diverse etiology. In our experience the edema which results from arteriolar relaxation without back pressure stasis is not marked in degree.

1b. Increased Capillary Permeability: The data presented in table II indicate that there was a considerable degree of concentration of the femoral venous blood in the erect posture as compared with that obtained when the patient was horizontal. This concentration is, how-

ever, a normal phenomenon and the figures given here are of the same order of magnitude as those quoted for normal persons[15]. There is, therefore, no evidence that the capillaries of our patient permitted the fluid to pass through with greater ease than normal. Moreover, there is no evidence that an abnormally great amount of protein escaped into the tissue fluid.

2. *Lowered Plasma Osmotic Pressure:* Clinically, edema due to lowered plasma osmotic pressure is almost invariably occasioned by a reduction in plasma albumin. Such reduction in plasma albumin may come about either through excessive loss of albumin or deficient intake. Loss of albumin usually occurs through the kidneys, in such conditions as acute and chronic nephritis with edema and nephrosis. Deficient intake of albumin clinically is seen in malnutritional states in which the protein in the diet is inadequate. In the three cases of ours in which plasma protein determinations were performed, the plasma proteins were quite normal and there was no evidence of renal disease, and the diets were adequate.

3. *Local Changes in Tissues:* Local changes in the tissues as the cause of the edema cannot be absolutely excluded but appear improbable. Clinically the edema was obviously of the intercellular type, both because of its pitting character and because of its rapid subsidence on rest in bed. It was quite unlike the swelling of myxedema. There was no evidence of associated endocrine disturbance. Such studies of the composition of the serum as were carried out were normal. The protein content of the edema fluid was not increased.

4. *Deficient Lymphatic Drainage:* It appears most likely, therefore, that the physiological cause of the edema in case W. H. is an interference with lymphatic drainage. This may be due either to partial lymphatic obstruction or to an actual anomaly of the lymphatic system. In view of the suggestive history of edema of the hands and face, it is quite possible that the disturbance of the lymphatics may be present throughout the body and that the edema merely manifests itself chiefly in the legs because of the added obstacle to drainage which the effect of gravity offers.

The etiology of the edema in the first two patients (L. J. and J. H.) is not so evident. It is probably also an interference with lymphatic drainage, but in these cases it may possibly have been simple pelvic lymphatic obstruction occurring during pregnancy. However, the coincidence that it occurred in both of these patients, and that it has persisted without other signs for such long periods, and that in one (L. J.) edema of the second leg did not appear for several months following childbirth, raises the question whether these patients, too, do not have a congenital abnormality of their lymphatic systems. This abnormality may have been of such slight degree that edema did not occur until an added trauma or infection in the lymphatics took place during pregnancy and the combined effect of the two factors resulted in permanent edema. Such a supposition, indeed, might explain many other cases of Milroy's disease in which the edema has not been congenital. Such patients may have required some further damage to their lymphatics in addition to the underlying structural abnormality. Moreover, it appears likely, as has been observed before[12], that many of these individuals are particularly prone to develop local infections in the region of impaired lymphatic drainage. The "acute attacks" described by Hope and French and those occurring in our patient J. H. were most probably such infections.

Since this article was submitted for publication the two young patients of this group (W. H. and R. H.) have suffered severe localized infections in their legs, similar to the "acute attacks" previously mentioned. Each had fever with redness, increased swelling, and tenderness of one leg. In W. H. the probable initiating lesion was pointed out by Dr. John Homans to be a severe attack of epidermophytosis of the toes. In R. H. the attack followed a cut in his foot. In this connection it is of interest to note that Drinker and his associates[18] have been able to produce lymphedema artificially in dogs by obliteration of the lymphatics of a leg, and it has been recently observed[19] that these dogs are frequently subject to periodic attacks of spontaneous localized infection in the edematous leg due to a hemolytic streptococcus.

The ineffectualness of attempts at controlling the edema by dietary measures or drugs has been stressed in nearly all of the published reports, and was true of our cases. Ordinarily simple bandaging suffices to keep the swelling from proving annoying. In the severe cases surgical measures have been advocated. There are both favorable and unfavorable reports in the literature of such measures. These have been designed either to relieve abnormal vasomotor spasm by periarterial sympathectomy[11, 16] or to improve lymphatic drainage by the Kondoleon operation[17] or by removing perilymphatic scar tissue. It is obvious that surgical interference should only be attempted after careful study of the case with a view toward determining so far as possible the physiological nature of the edema.

SUMMARY AND CONCLUSIONS

A report is made of four cases of chronic edema of the legs occurring in three generations of a single family. Three of these patients

were personally observed by the authors. The clinical characteristics of these cases are consistent with the syndrome known as Milroy's disease. Studies made on one of the patients suggest that the most probable cause of the edema is an interference with lymphatic drainage. This lymphatic obstruction may be due to a congenital abnormality of the lymphatic vessels with or without an added factor of infection or trauma.

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EDEMA OF THE LEGS DUE TO LOCAL CAUSES

JOHN HOMANS, M.D.*

OUTSIDE of the edema of renal and cardiac diseases there are many swellings of the feet and legs of obscure origin. Some of these are immediately or remotely due to thrombophlebitis, but just as there are many ulcers of the legs not of varicose origin, so there are edemas in which disease of the veins plays no part. For many such no cause can in fact be discovered, and if a classification were attempted, it would only be possible to place in one category the edemas of phlebitis and in the other, all other sorts.

PHLEBITIC AND POSTPHLEBITIC EDEMAS

In the consideration of these edemas, varicose veins, whether or not thrombosed, can, as a direct cause, be dismissed. Varicosity is always confined to the superficial veins, for if the veins within the deep fascial sheath shared the incompetence of the superficial vessels, blood could not be returned from dependent legs. The engorgement of varix is not, therefore, generalized, and it induces an edema of so little consequence as completely to be overshadowed by the dilatation of the superficial veins. Thus, varicose legs, enlarged as they sometimes appear, seldom pit on pressure. This statement does not apply to the edemas which may be associated with old varicose ulcers. These will later be described.

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Edemas following Phlegmasia Alba Dolens (Thrombophlebitis of the "milk-leg" type). Thrombosis of the deep veins, if distributed sufficiently widely, causes an excessive edema. I have offered evidence elsewhere that this process is most likely to originate in the pelvis, where it reaches its maximum intensity, so that a solid clot is sure to occupy the external, perhaps the common, iliac vein and to extend down the femoral to or below the knee. Moreover, since the great saphenous vein empties into the femoral at a point where the latter is almost certain to be thrombosed, more or less of the great saphenous system as well is apt to be occluded. Apparently there are at least two sorts of phlegmasia alba dolens (1), a variety in which there is an active nonsuppurative inflammation within the arteriovenous sheath, quite as noteworthy about the artery as the vein, and (2), another which is marked by no such reaction. In the first sort, there is a strong suggestion that a deep, perivascular lymphangitis* is present, a process which may be responsible for the venous thrombosis and which

*Evidence that such a lesion exists has been offered in previous publications:

Homans, John: Thrombophlebitis of the lower extremities. Ann. Surg. 87: 641 (May) 1928.

The operative treatment of phlegmasia alba dolens. New Eng. J. Med. 204: 1025 (May 14) 1931.

Phlegmasia alba dolens and the relation of the lymphatics to thrombophlebitis. Am. Heart J. 7: 415, 1932.

has been shown to cause arterial spasm† as well. In the second, there is no perivascular inflammation; in which case, it may be supposed that the thrombosis is due, primarily, to some peculiar state of the blood—a purely intravenous process. These distinctions, still imperfectly understood, have been partially worked out at the operating table. When a perivascular inflammation has been found about the great pelvic vessels, splitting their sheath along the brim of the pelvis and release of the exudate within it has caused the swelling of the leg to disappear with astonishing promptness, suggesting that lymphatic obstruction has been relieved though venous thrombosis is still present. As yet, however, a clinical distinction between what may perhaps be called the type of lymphatic origin and the pure venous type is still to seek. And as Zimmermann and de Takáts‡ have shown, thrombosis of veins, in the lower limb, if sufficiently extensive, causes an outpouring into the tissue spaces of so albuminous and bloody a fluid that even in their normal state the lymphatics could never carry it off. And as if this were not sufficient, pelvic exploration in the acute stage of phlegmasia alba dolens of the primary venous type has demonstrated that the great lymph trunks of the arteriovenous sheaths may themselves become plugged, secondarily it would seem, with coagulated lymph.

Enough has been said, perhaps, to make it clear that thrombophlebitis of the "milk-leg" type, even after the principal veins have been recanalized and new channels have been made available, may well leave behind a decided tendency to lymph-edema. Indeed, postphlebitic swellings are sufficiently familiar. In some instances, the leg remains enlarged up to the level of the inguinal ligament and the gluteal fold. It is not disabled. The individual is able to take exercise. But a long day on his or her feet leaves the patient with a very uncomfortably swollen leg which only partly subsides after a night in bed. Its color does not suggest much venous obstruction, though it may take on a decided pinkish-blue shade upon long standing, and the superficial veins are seldom enlarged. Yet between them, the veins and lymphatics are unable successfully to drain the leg and on the whole the lymphatics seem to be the more incompetent.

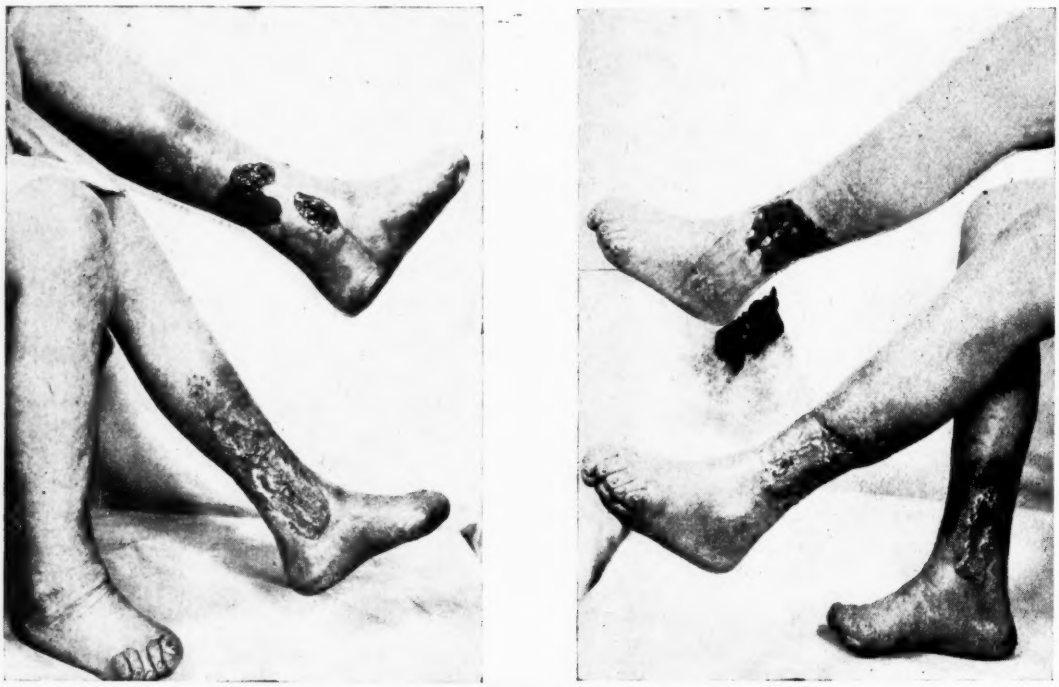

FIGURE 1. Ulcers of unknown origin. Those on the left leg nearly encircle the leg. Moderate edema of the foot. Excision and skin graft March, 1933. No permeable lymphatics found superficial to the aponeurosis. In the upper part of the photograph are shown the ulcers, before treatment. In the lower, the early result of excision and skin graft. The grafts have not yet assumed their final color and consistency.

The tissues themselves are probably slow to be damaged by such edemas. It is not until stasis has existed for a long time that any generalized fibrosis occurs. Yet my first interest in these postphlebitic edemas arose from the *local* indurations and ulcerations of the lower leg which occasionally follow phlebitis—six months, a year, five years or even ten or more years la-

†That arterial spasm, serious enough to indicate embolism, may occur with the onset of a deep thrombophlebitis has been suggested in the publications quoted in the previous note and an excellent clinical description of such an occurrence will be found in Dr. Allen G. Rice's discussion of a paper on Thrombophlebitis by Dr. Ernest L. Hunt, read at a meeting of the New England Surgical Society in 1932 and published in the New Eng. J. Med. 208: 730 (Apr. 6) 1933.

‡Zimmermann, L. M., and de Takáts, G.: The mechanism of thrombophlebitis edema. Arch. Surg. 23: 937, 1931.

ter. These are the result of a fibrosis which is altogether superficial but which is severe enough to render nearly bloodless the subcutaneous tissues of some particular area, down to, but never beneath the muscular aponeurosis. From which it follows that if such ulcerations prove intractable to palliative measures, they can be cured only by a wide excision which must include the muscular aponeurosis beneath them, thus exposing the delicate reticular layer which covers the muscles and tendons. Upon this base a skin graft will thrive. Upon anything less deep it may "take" but subsequently will be cast off.

The serious effects of postphlebitic edema are, then, heavy, swollen legs and, in some cases, local swelling, induration and ulceration. The means by which residual edema can, in any effective degree, be forestalled being as yet undetermined, it will be more profitable to discuss the treatment of the residual condition.

Treatment of Residual Postphlebitic Edema. The history being known, the amount of standing, sitting and active exercise* which the subject can take without an undue increase of edema must be discovered, usually by the intelligent coöperation of the patient. Just enough standing, sitting and exercise is the amount which is well compensated for by a night's sleep, so that each morning the leg is reasonably soft and free from swelling. Too much standing leaves the leg tense and uncomfortable the following day.

On going to bed each night, the patient should raise the leg in the air and exercise it in that position. If the leg is particularly heavy, the foot should be placed against the frame of the bed or made to rest upon a reversed chair and pillow. In this position the foot should be moved up, down, in and out, using the muscles of the calf as freely as possible. The more often this procedure can be used, the more effectively will fluid be pushed and drained from the leg.

In sitting with the legs on the ground it will be of advantage to tighten the muscles of the calf from time to time; for complete relaxation encourages fluid to collect in dependent parts. Whenever possible, the swollen leg should be elevated upon a stool.

Bandages of the semi-elastic cotton type or elastic stockings may be of advantage. In general, they will not control swelling not otherwise in some degree controllable and so may cause unbearable pressure in serious cases. Yet if the tendency to edema is only moderate, they are reasonably effective.

Pronated Feet are very commonly noticed with postphlebitic swelling. Indeed, if both legs are swollen but one more so than the other, the foot showing the greatest pronation is apt to be on the more edematous side. It is usually difficult to decide whether pronation has occurred because the leg is otherwise crippled, or whether pronation, already present, has made the swelling worse by interfering with natural use of the muscles. In either case, the usual exercises intended to strengthen inversion and tibial flexion of the foot should be advised and the ankles tilted outward by raising the median side of the heels.

Sources of Local Infection about the feet and legs should be eliminated, more especially epidermophytosis, and the skin should be kept particularly clean.

As to the *Prognosis*, it is generally true that the more severe the initial swelling and the longer it lasts, the more likely is the patient to suffer from residual edema. However, these criteria are no more to be relied on for a prognosis than is the height and duration of fever. There are many exceptions to any such generalizations.

Edemas due to Local (traumatic) Thromboses in the calf. Occasionally, and from apparently trivial causes, as, for instance, after fracture of a metatarsal bone, the calf and foot may become swollen and bluish, the thigh being quite normal. The condition is readily distinguishable from phlegmasia alba dolens even though the pain of the latter be referred, as in the beginning it often is, to the knee or lower leg. The story is apt to be that the patient suffers discomfort and swelling of the calf, seems to recover on going to bed and again notices swelling upon getting about. Fatal embolism sometimes occurs, at least in persons of middle age or beyond, and after witnessing such a fatality, Dr. Channing Frothingham of Boston suggested to me that, in a second case under his care, an effort be made to prevent this accident. Accordingly I divided the femoral vein in Hunter's canal, a procedure which seemed to me certain to prevent embolism from the deep veins of the calf and which, as it turned out, led to complete and rapid recovery.

EDEMAS OF UNCERTAIN ETIOLOGY: LYMPH-STASIS

Non-Filarial Elephantiasis. These states of serious and often disabling edema differ from those due to filarial infestation, not so much in their clinical appearance and behavior as in their mysterious origin. Filarial elephantiasis is believed to be due to actual choking of the principal lymphatic pathways from the lower limbs or scrotum by the filarial organism. The edemas under discussion here have no such cause. There is a familial form, known as Mil-

*Muscular pressure tends normally to force blood and lymph through the veins and lymphatics respectively toward the heart. Yet this action is only effective when the vessels possess adequate valves, and after a severe thrombophlebitis it must be supposed that the valvular mechanism of both veins and lymphatics is in some degree crippled. Hence active exercise is an uncertain factor in the residual edemas of the sort described.

roy's* disease, and there are sporadic instances which occur as a rule in young individuals of both sexes, but as yet little is known of the cause of either sort. Clinically the two are much alike, though patients suffering from Milroy's disease are particularly subject to the remarkable self-limited attacks of fever and local inflammation so characteristic of filarial elephantiasis, whereas those exhibiting the sporadic do not seem to be. It might be supposed that, because a rather typical elephantiasis results from some radical dissections of the axilla for cancer of the breast, swelling of the leg must be due to obstruction of the lymph channels where all come together at the groin to proceed along the great iliac arteriovenous sheath into the receptaculum chyli. Indeed, such may be the case, but there is just as good ground for asserting that varicosity of the lymphatics is the cause, and indeed an analogy can be drawn between the varicosities of veins which so often appear in growing and grown girls and boys (near puberty) and a supposed varicosity of lymphatics, for the sporadic elephantiases usually show themselves in young women at about this time. It is conceivable also, as seems to have been demonstrated by exploratory incision in a recent case under my care, that an altogether unnoticed non-suppurative, inflammatory process may completely wipe out of existence the lymphatics of the superficial tissues, leaving these parts soaked in fluid which can only escape through ill-defined fascial spaces. Moreover, there are those who assert that the lymphatics have nothing to do with such states and that some hypothetical vasomotor disorder† is responsible for the failure of the tissue fluids to be carried from legs.

Whatever its cause, non-filarial lymph-edema appears and progresses in an insidious way. Occasionally it commences in childhood, or even in infancy. Rarely it comes on first in the thirties. It is usually painless, troubling the patient mainly because of the sheer weight of the leg. Some reports of Milroy's disease indicate that the edema, which always progresses from below up, may have a fairly well-defined upper border. Thus it may, at first, be limited to the foot and ankle, then progress rather rapidly to and halt at the region just below or above the knee, and, finally, mount to the inguinal ligament. But it may stop at any point on the way. More often, perhaps, it spreads insidiously from ankle to groin over a period of months or years. Almost invariably it stops at the inguinal ligament in front and the gluteal fold behind. The scrotum or vulva, as the case may be, is rarely involved, the abdominal wall, never. Both legs may be affected, but seldom in the same degree.

FIGURE 2. Non-filarial (sporadic) elephantiasis in a woman of 34. Disease of seven years' duration. Patient has had three children, the last within a year. No phlebitis. The swelling stops at the inguinal ligament. Permanent changes in the skin have occurred. Untreated.

Sooner or later the skin becomes coarsened and thickened, perhaps with a tendency to scale. Occasionally it is thrown into great folds or into a forest of papillae.

Specimens taken from the subcutaneous tissues in elephantiasis show a non-specific sort of fibrosis in which the fat is more or less destroyed. In some instances, traces of dilated lymph vessels have been described and there are great spaces full of tissue fluids. Such changes appear to parallel the clinical course of the disease.

The attacks of fever and local redness which so often take place in the familial form, come at irregular intervals, but in any one case are always of about the same severity and duration. The fever may rise to 103°-104°, there is often vomiting, the leg is apt to be red, tender and additionally swollen, and the patient is prostrated, but the attack is absolutely self-limited and is rapidly recovered from. Such a complication is seldom present from the first, but comes on after the patient has already harbored the malady for many years. However, all members of a family suffering from the disease

*Milroy, W. F.: An undescribed variety of hereditary oedema. N. Y. Med. J. 56: 505, 1892. See also:
Meige, Henry: Dystrophie oedémateuse héréditaire. Presse méd. 6²: 341, 1898.

†Leriche, R., et Jung, A.: Recherches expérimentales sur les oedèmes chirurgicaux des membres d'origine phlébitique. J. de chir. 37: 481, 1931.
There is no doubt that a spasm of the venules—the arterial stream being unaffected—would produce a very decided edema. Of course, no such clinical state is recognized but Drinker and other investigators have shown that as venous pressure is raised, the tissues become filled with a fluid of low protein content, that is, an abundant transudate from the capillary bed. Drinker, C. K., and Field, Madeleine E.: Lymphatics, Lymph and Tissue Fluid. Baltimore, Williams and Wilkins, 1933, pp. 142-3.

do not have the attacks. Some go through life to old age, showing nothing but the edema which they control well with bandages. In a most interesting account of an English family, given by Hope and French*, the authors tried in vain to secure a photograph of the swollen legs of some of the men affected. These knew that if they left off their bandages and allowed swelling to occur, they must pay for their negligence by some days in bed. And so the only photographs secured were of thin legs covered with the marks of bandages.

Up to this time, surgical treatment has been limited to cutting out great masses of fibrosed edematous tissue and removing long strips of the muscular aponeurosis and the heavily scarred tissue which lies upon it, the so-called Kondoleon operation. The object of removing the deep fascia and scar is to facilitate drainage of the surface fluids into the healthier tissues beneath the fibrous muscular envelope. But though it is true that lymph-stasis and fibrosis are advanced outside the sheath and seem to be absent within it, the primary obstruction to the flow of lymph from the leg, or perhaps it would be better to say, the upper limit of the disease, is almost necessarily at or central to the inguinal region. In that case, even if tissue fluids can be made to flow from superficial to deep parts, their progress toward the thoracic duct must then continue by way of intermuscular spaces and with the aid of muscular contractions—matters as to which nothing is known. Doubtless, when the nature of lymph-stasis is better understood, some more effective operation will be devised. In the meanwhile, whether or not strips of the deep fascia are excised, it will always be necessary to remove masses of hypertrophied skin and lymph-soaked subcutaneous tissue from unwieldy legs.

Filarial Elephantiasis. Though the infestation which occasions this deformity is only endemic in tropical and subtropical countries, individuals harboring the parasite are coming to such great cosmopolitan centers as New York in increasing numbers. A large proportion of all those infected with the Wuchereria bancrofti never develop elephantiasis and indeed, the disease may, as O'Connor has shown, be harbored by an individual for 20 years or more without causing any recognizable disorder. Actually to occasion lymph-stasis, filarial organisms must occupy the lymph nodes and channels at the root of a limb, usually the leg, in great numbers. While they live, though they may excite a considerable formation of new tissue, they seldom interfere seriously with the flow of lymph, but as they begin to degenerate and die, they call forth an obstructing fibrosis, usually themselves becoming calcified. Collections of filaria occur also peripherally, forming the so-called "focal points" where, as in other situations, they may become necrotic. Uneasy sensations in such areas sometimes warn of the characteristic febrile attacks. Recently it has been shown* that calcified worms are readily demonstrable in roentgenograms, and doubtless by this means filarial elephantiasis can be distinguished in doubtful cases from other forms.

As already has been suggested, there are mild and serious degrees of filarial elephantiasis, and since the disease is of very gradual development, it is indistinguishable clinically from non-specific forms. However, the remarkable attacks of "lymphangitis" and fever, already described as marking Milroy's disease, are decidedly more common in filarial elephantiasis. These come at roughly monthly intervals, are rather constant in character for any one individual, and are attended by local redness, swelling and high fever with a low leucocyte count (initial rise). O'Connor suggests that they represent allergic phenomena due to the release of protein substances from dead or dying worms, but since similar attacks frequently occur in the non-filarial disease, this hypothesis is hardly convincing. Those familiar with the attacks recognize that though more or less rhythmic, they seem to be excited by such factors as constipation, changes in the weather, alcoholic excess or overexertion and, in women, by menstruation. However, an infectious element is now generally believed to be responsible, and evidence is at hand that streptococci become implanted in parts chronically engorged with lymph and already considerably fibrosed, that presumably they linger in the tissues between attacks and can be found in the tissue fluid during each outbreak. With repeated attacks, a vicious circle of fibrosis, cutaneous deformity and lowered resistance to infection is established.

In respect to *treatment*, filarial elephantiasis is in the same situation as the non-specific forms. Whether dilated lymphatics are present in serious cases and, if so, are so situated that they may perhaps be drained into healthy parts, is not yet known. At present, all that can be offered is the removal of redundant tissues and whatever benefit may come from excision of strips of the muscular aponeurosis.

EDEMA DUE TO ULCERS

Whether any extensive ulcer which nearly surrounds the leg is or is not of varicose origin is immaterial. Many a widespread ulcerative process resembles the familiar varicose or postphlebitic ulcer, yet no antecedent cause can be discovered. Of greater interest is the degree

*Hope, W. B., and French, H.: Persistent hereditary oedema of the legs with acute exacerbations. Quart. J. Med. 1: 312, 1907-1908.

*O'Connor, F. W.; Golden, R., and Auchincloss, H.: The roentgen demonstration of calcified Filaria bancrofti in human tissues. Am. J. Roentgenol. 23: 494, 1930.

of fibrosis beneath and about it, for should this process encircle the leg, reducing the tissues between skin and muscular sheath to a porky scar, lymph-drainage from the adjacent area and from the foot is decidedly obstructed. The deep lymphatics are still available, but some swelling, from the most moderate edema up to an advanced sort of elephantiasis, is likely to be present. In the course of excising such an ulcer and covering it with a Thiersch graft, I have tried injecting a solution of trypan blue* (which the lymphatics pick up readily) into the superficial part of the foot, but have found no sign of the dye passing through or near the

FIGURE 3. A colored woman of 61. Ulcer of left leg for 15 years—gradual spread. No cause known. Elephantiasis of foot has developed within a comparatively short time, perhaps less than a year, according to the patient's account.

scarred area. However, on a similar occasion, before I was familiar with the use of the dye, I inadvertently injured some lymphatics behind the muscular aponeurosis and a leak ensued which has persisted ever since.

Probably the best treatment, for both the ulcer and the lymph-edema below it, is wide excision of the whole indurated region, taking at the same time the deep fascia beneath, and exposing muscle, tendon-sheath and bone. If such an excision is performed with the most rigidly aseptic technic and the great area is immediately covered with a Thiersch graft, healing promptly occurs. At the same time, the deep parts are, as it were, decompressed, so that the local circulation is undoubtedly improved. Less radical measures usually fail.

*An account of the behavior of this dye will be found in a paper on the flow of lymph in the dog's foot by White, J. C., Field, M. E., and Drinker, C. K.: Am. J. Physiol. 103: 34, 1933.

EDEMA DUE TO INJURY

As to such edema, I speak with a good deal of hesitation. I have seen one or two women who, following injuries of various sorts, have since suffered from a moderate edema. In one case, there had previously been noted a tendency of the feet to swell in hot weather. There was no renal or cardiac disease. Following a violent disabling pain in the upper calf of one leg while dancing (rupture of muscle or tendon?), a disagreeable swelling came on and in some degree has since persisted. There is decided pronation of the foot as compared with that of the opposite side.

In another instance, the patient injured both ankles in an automobile accident some years ago. Since then the ankles have swollen most annoyingly. There is no sign of malposition as from a fracture, but on the side of the greatest swelling the foot is decidedly pronated. Here, as in the previous case, it must be supposed that something has upset the delicate mechanism by which fluid is forced up out of the legs. Pronation of the foot may be either cause or effect, but in any case, appropriate exercises, shoeing and bandaging ought to be of advantage.

EDEMA WITH LOW METABOLISM

I have seen one girl and have a report of another, both of whom are troubled with swollen legs and both of whom have a low metabolism, that is, more than 25 per cent below the normal. The legs have been large from childhood, yet in neither case has any other change suggested that myxedema existed. Certainly in one instance, the girl, about 19 when studied, was unusually quick, intelligent and a first-rate athlete. The legs, in this instance, were considerably enlarged to the level of the knees, did not pit on pressure and have remained unchanged in spite of the adequate administration of desiccated thyroid gland. It is difficult to discover the cause of such a condition, especially now that thickening of the skin and subcutaneous tissues has probably become organically fixed. Certainly it cannot be laid directly to myxedema, since other signs of the disease (save the low metabolism) are absent and myxedematous persons present no such picture.

COMMENT

It is evident that a number of local disorders are capable of upsetting the delicate mechanism by which the tissue fluids are carried by the lymphatics from the legs. Many of these, and particularly such as result in a gross elephantiasis, are thought to cause an actual obstruction to the main trunks at the root of the limb. But all elephantiasis is not necessarily of this sort, or at least may not originate in a centralized

obstruction to the flow of lymph. There may conceivably be varicosity of lymphatics or widespread peripheral destruction. Only study of the early stages of lymph-edema—before secondary extensive fibrosis has occurred—will throw light upon such matters.

Venous thrombosis not only of itself causes edema but may be associated with disorders of important lymphatic pathways which lead, even though the venous circulation is restored, to prolonged lymph-stasis of all or part of the leg. Local edema, fibrosis and ulceration from this cause is relatively common and is curable by operative means. Generalized edema is common, is often disabling and as yet has not been found responsive to treatment.

THE DENTISTS' ACHIEVEMENT IN THE DISCOVERY AND DEVELOPMENT OF ANAESTHESIA*

BY LEROY M. S. MINER, D.M.D., M.D., D.Sc.†

YOU will not expect or desire from me on this occasion any general account of the great achievement which we are gathered here to commemorate. It has been very amply treated in its historical, clinical and medical aspects; far more ably than I could hope to treat it. The addresses given here on earlier anniversaries of Ether Day by masters of surgery like Warren, Keen, Cushing, Mayo and Crile; by physicians like Weir Mitchell, Shattuck, Finney and Cabot and by medical authorities like Flexner and Zinsser, seem to leave hardly a shred of fact or interpretation to be added. And yet there is a phase of the subject which has not had the attention it deserves—a phase which at least has a special interest for one branch of our guild of medicine. This is the part that dentists have had, both in the beginnings and in the later developments, of the use of ether as an anaesthetic.

In recalling the origins of Ether Day which are a part of the history of this famous old hospital, we should not for a moment forget, however, that the thing which occurred in the Dome there, eighty-seven years ago, was not a matter which affected surgery only, or medicine only, but one that profoundly affected everyone then living and everybody to be born into the world thereafter.

THE RECORD

In the formal language of the official records of the hospital, the event which we observe on Ether Day is described as follows: "Dr. Warren had been applied to by Mr. Morton, a dentist, with the request that he would try the inhalation of a fluid which, he said, he had found to be effectual in preventing pain during operations upon the teeth. Dr. Warren, having satisfied himself that the breathing of the fluid would be harmless, agreed to employ it when an opportunity presented‡." This he did with entire success and, as the report states, "The results of this operation led to the repetition of the use of ether in other cases, and in a few days its success was established, and its use resorted to in every considerable operation in the city of Boston and its vicinity."

THE CONTROVERSY

For our immediate purpose, the significant words in the passage I have cited are "Mr. Morton, a dentist." About these words there raged, as you all know, for many years a controversy of uncommon bitterness, of which occasional echoes are still heard. Such an echo has come to my ears even while I have been preparing these remarks. I cannot flatter myself that I can say the last word in that debate, but so conclusive and incontrovertible is the evidence and the testimony in support of Morton's claim, as to leave little room for further dispute. In addition to the contemporary judgments of the officials of this Hospital, the committee of Boston citizens, and the temperate and weighty judgment of Richard Henry Dana made after prolonged study, all of which unequivocally awarded the decision to Morton, we have the verdicts given by three of the most competent authorities who have ever considered the subject:

The first is that of Dr. John Collins Warren, the courageous and skilful surgeon who performed the historic operation here eighty-seven years ago, and who described Morton as the "one in whose hands surgical anaesthesia became a reality".

The second authority is Dr. William H. Welch of Johns Hopkins, the Dean of American Medcine, who, in his address here on Ether Day in 1908, said, "My conclusions are in essential agreement with those of Dr. Mumford when he says that 'Time and history are at last placing the honor where it belongs—with Morton*'."

And the third is the late Sir William Osler, who, speaking before the Royal Society of Medicine on May 15, 1918, in one of the last public addresses he made, said, "Why do we not give

*Ether Day Address October 16, 1933.

†Miner—Dean, Harvard University Dental School. For record and address of author see "This Week's Issue," page 966.

‡The Semi-Centennial of Anaesthesia. P. 87. 1897.

*Consideration of the Introduction of Surgical Anaesthesia. William H. Welch. P. 14.

the credit to Dioscorides, who described both general and local anaesthesia, or to Pliny, or Apuleius or to Hiotho, the Chinaman, who seems to be next in order, or to the inventor of the *spongia somnifera*, or to Master Mazzeo in Boccaccio, or to any one of the score or more of men in the Middle Ages who are known to have operated on patients made insensible by drugs or vapors? Why do we not give the credit to Davy, who had the idea, or to Hickman, who had both idea and practice, or to Esdaile, who operated on hundreds of patients in the hypnotic state, or to Elliotson, who did the same; or to Wells, who, in 1844, operated under nitrous oxide, or to Long, who frequently practised ether anaesthesia? Why? Because time out of mind, patients had been rendered insensible by potions or vapors, or by other methods, without any one forcing any one method into general acceptance, or influencing in any way surgical practice.

"Before October 16, 1846, surgical anaesthesia did not exist—within a few months it became a world-wide procedure; and the full credit for its introduction must be given to William Thomas Green Morton, who, on the date mentioned, demonstrated at the Massachusetts General Hospital the simplicity and safety of ether anaesthesia. On the priority question let me quote two appropriate paragraphs.

The first is from Sir Richard Owen, the first Hunterian Professor of Comparative Anatomy. "He becomes the true discoverer who establishes the truth; and the sign of the truth is the general acceptance. Whoever, therefore, resumes the investigation of neglected or repudiated doctrine, elicits its true demonstration, and discovers and explains the nature of the errors which have led to its tacit or declared rejection, may certainly and confidently await the acknowledgments of his right in its discovery." The second is from Francis Darwin, the son of the founder of evolution. " 'In science the credit goes to the man who convinces the world, not to the man to whom the idea first occurs.' Morton convinced the world; the credit is his."*

With these and other such weighty authorities on record, it seems hardly possible that serious doubt could have survived. And yet there stands in Boston's Public Garden a monument commemorating the discovery of ether as an anaesthetic. It has been there for considerably more than half a century; it was erected in 1867; but it bears no name. As a monument to a discovery without a discoverer, it leaves half the story untold.

Of course ether anaesthesia as demonstrated by Morton was not a perfect and completed accomplishment. Almost at once the method of administration was improved, Morton's original apparatus was discarded for a better one, and further improvement has been continually going on. The technique is still in process of perfection. Yet, even were the contribution made by Morton far less—were it even but a mere fraction of what it actually was, the world's debt would be beyond all computation. There is due him a tribute of gratitude which can never be exceeded, and it would ill become us to curtail or diminish it. Let it be admitted that he was not the most heroic of inventors; that he was chargeable with errors of judgment and a too eager grasping at material rewards. We must also admit with Mumford that for these faults he paid in full. The account is clear.

If any one hesitates or feels reluctant at paying homage to Morton's memory, let him ask what would have been the outcome if he, like Wells, had been unsuccessful or if, by any mischance, Abbott had died under the ether. Let us recall also that, when the "Semi-Centennial of Anaesthesia" was celebrated here in 1896, there was no doubtful or dissenting voice. In the account given by Dr. James G. Mumford in his "Narrative of Medicine in America" he says, "the name of Morton *only* was heard, and the words of Jacob Bigelow were heartily seconded:

" 'The suffering and now exempted world,' said Bigelow, 'have not forgotten the poor dentist who, amid poverty, privation, and discouragement, matured and established the most beneficent discovery which has blessed humanity since the primeval days of Paradise!' "*

Perhaps some day Boston will cease to be content to let the monument in her Public Garden remain nameless, and will join with the masters of science and medicine in recognizing Morton as the discoverer.

THE DENTISTS' PART

But the part which dentists played in making ether available was not confined to this country. In England also where history repeated itself, it was a dentist who introduced it—a Mr. Robinson, of Gower Street, London, who had learned of Morton's successes, took up ether, and applied it in his practice. It was only after Sir Robert Liston had witnessed an extraction of a tooth under ether by Mr. Robinson that this famous surgeon ventured to use it and then, on December 21, a few days more than two months after Dr. Warren's operation here, the first operation under anaesthetics to be performed in England was done at the University College Hospital with, as Sir Robert announced, "the most perfect and satisfactory results."†

Thus, in a few weeks, ether was in use and its almost miraculous effects were being acclaimed on both sides of the ocean. Of all great discoveries few were so sudden and so unheralded. To those who were most deeply concerned—the physicians and surgeons—it came as a complete surprise and flashed upon them, as upon

*Osler, Sir William: The first printed documents relating to modern surgical anesthesia. Ann. Med. History 1: 329, 1917.

*Narrative of Medicine in America. Mumford. P. 426.
†The Semi-Centennial of Anaesthesia. P. 94. 1897.

the rest of the world, like a bolt from the blue. Harvey Cushing has pointed out how definitely unaware of the problem the profession was. Hardly any Boston physician had even an inkling of the event that was in preparation. There had been no preliminary conversations. It seems doubtful whether any one of those active in the experimental stages, except possibly Morton, had even been inside the Hospital until the hour of the demonstration, and Morton was unknown to the profession. Only a few years before the event we are celebrating, a distinguished French surgeon had declared that the idea of separating surgical operations and pain was a chimera.

So spontaneous, so heartfelt and so unrestrained was the outburst of relief, joy and thanksgiving over the discovery that to the world ether seemed like a veritable miracle straight from the hand of the Creator. No wonder Morton was carried away on the general tide of exultation, lost his head and went after the will o' the wisp of a patent, on what ought never to be subject to patent or any other restriction upon its beneficent purpose. It is difficult to recall the mood of exhilaration and jubilance with which great surgeons and medical authorities received the news. It was as if the greater the man was, the wider his knowledge and the deeper his understanding of medicine and surgery, the more stupendous and miraculous the effects of ether appeared to him.

"Hurrah," shouted Sir Robert Liston, after his first operation under ether, "Rejoice! Mesmerism and its professors have met with a heavy blow and great discouragement. An American dentist has used the inhalation of ether to destroy sensation in his operations and the plan has succeeded in the hands of Warren, Hayward and others in Boston. In six months no operation will be performed without this previous preparation. Rejoice!"* and Dr. John Struthers, the President of the Royal Infirmary College of London, wrote, "I well remember when the news came across the Atlantic, the first use of ether in that great theatre by my old masters, Symes and Miller. The change was wonderful; no longer pain, the patient lying nearly as quiet as the sleeper and the operator undisturbed and risking nothing by haste†."

CAUSE FOR DENTISTS' INTEREST

Before turning to examine more fully the effects and the later developments of anaesthesia, we may pause a moment to inquire why dentists more than other medical men should have concerned themselves with anaesthetics. The reason, I think, may be found in the peculiarly poignant and exquisite form of pain to which the teeth give rise. By common consent there are few forms of physical agony more intense than that of toothache and there seems to be no doubt that we shall have to look very far back in the origins of the race to find the causes for the quite exceptional and acute sensitiveness of the teeth and their surrounding tissues. In what Dr. Crile calls the phylogenetic origins, which run back in time far beyond our history, we may surmise that the teeth were one of the centers in which, among the precursors of man, injury and disease were more than usually frequent and more than usually dangerous. Hence the concentration at the teeth of a very abundant supply of nerve fibres, running to exquisite and delicate filaments, and conveying no less exquisite and delicate variations and intensities of pain.

Now the dentist could not be unmindful of this. It affected his daily occupation. Morton, for example, was the maker of artificial teeth. He found his livelihood constantly affected unfavorably by the old snags and fangs which remained in the jaw, because his patients were unwilling to have them removed, by reason of the pain and discomfort involved. We may surely add to this mercenary motive the normal physician's interest in his patients; his desire to lessen their pain and perhaps to remove the cause. Both motives would conspire to give him a lively interest in anything which would reduce or abolish all the forms of pain in the teeth. In the case of Morton we may also add an active and enterprising disposition and a true inventor's mind which, inspired by a problem, could not rest until it had found a solution.

A NEW ERA

At any rate, the discovery and use of ether as an anaesthetic marked the end of one era in medicine and the beginning of another. No matter how often the contrast is drawn between the surgery before ether and that which has followed, the reality can never be fully presented. Yet the attempt to realize it is one way by which the immeasurable benefit of anaesthesia can, in part at least, be made convincing.

A trifle may help to make the past reality more vivid. In the Museum at Fort Ticonderoga this summer the attendant showed me a number of pre-Revolutionary lead bullets, some that bear marks of being fired from French and British muskets, and some that have the marks of teeth. These, he told me, were served out to men to bite on while undergoing surgical treatment to help them bear the pain. In some of the bullets the marks of the teeth are quite deep. They may have afforded some measure of relief, but they must have been a poor substitute for a true anaesthetic.

Consider what a change has passed over the surgeons! Before the day of ether, the great-

*A Consideration of the Introduction of Surgical Anaesthesia. William H. Welch. P. 8.

†The Semi-Centennial of Anaesthesia. P. 92. 1897.

est of them, men like John Hunter, Abernethy and Cheselden shrank from operations as a hardship and a reproach. Hunter pictures the operating surgeon as "an armed savage". It is said that Cheselden, who was a famous operator, cool, firm and dextrous, seldom slept the night before an operation and both he and Abernethy regarded operations as the reproach of surgery. Even Sir James Simpson, the introducer of chloroform, "was so affected by seeing the terrible agony of a poor Highland woman, under amputation of the breast, that he formed the resolution—which fortunately he did not keep—to abandon a medical career and seek other occupation*."

One reason for the repugnance with which intelligent and sensitive physicians regarded operations was the mortality which, up to the time of the Napoleonic wars, was really frightful. It was the rule in the famous hospital of the Hotel Dieu in Paris that every case of amputation of a limb died, and the French surgeon Fauré reported after the battle of Fontenoy that of three hundred amputations only thirty recovered. As late as 1840 in France major amputations for disease gave a mortality of fifty per cent†, and the records in England and the United States were not very much better.

IMPROVEMENTS IN THE USE OF ETHER

So spectacular and immediate was the success of ether, which, in Harvey Cushing's phrase, "burst on the world full blown in its effectiveness in a single day in these very halls," that there was a disposition to credit it with solving all the difficulties of surgery. Of course nothing of the kind was true.

To be sure, the verdict of witnesses of its first use remained the verdict of history. It was still, as President Eliot of Harvard declared, "the most beneficent gift which chemical and medical science has conferred on mankind". It remained true, in the words of another authority, that "the culminating event of the century in the surgical history of this hospital was reached on October 16, 1846, when it was first demonstrated 'that ether may be applied with safety, so as to produce insensibility during all surgical operations' ". But ether anaesthesia ceased gradually to be regarded as a flawless miracle. In course of time it was perceived that, like all human accomplishments, it left room for improvement.

With experience and observation came more moderate and more correct judgments of its scope and its limitations. Deaths from operations continued and it was soon apparent that they had not diminished. In fact the records in many places showed an actual increase of mortality. This was explained partly by the fact that there was a great increase in the number of operations. Surgeons, relieved from the sight of their patients' suffering, were more willing to operate; patients, on the other hand, were less reluctant, and some, probably less hardy and rugged than those of the pre-ether period, were unequal to the strain. Moreover there was less haste in operating, and the increased leisure, with the temptation to extend and prolong the operating procedure, meant increased danger to the patient from exhaustion. It meant also danger from infection, the danger from which continued, unabated, until Lister developed his antiseptic treatment.

LIMITATIONS OF ANAESTHESIA

Besides, the essentially fatal part of the operation remained—the injury to nerve, muscle and other tissues of the patient. And of all this, the patient was more or less aware; the fact that he was under ether never for a moment cancelled the full effects of the injury he underwent. The brain was not wholly anaesthetized—if it had been he would have died—and it recorded, and responded to, the full enormity of the experience. Not at once was this realized; it took time for surgeons and laymen alike to realize fully the limitations of anaesthesia. The disposition to believe that what the patient could not feel could not harm him, was only gradually given up. Step by step came the realization that, though pain was abolished, the wounds of which it was the token were not diminished in their effects; that pain was not the fatal thing, but the injury that caused it.

These observations set in motion a more searching investigation into the precise effects of anaesthetics and the demand for more exact delimitation of its influence upon muscle, bone, nerve, and brain tissue. Some of the results of that study have been presented here in Ether Day Addresses; in 1910 by Dr. Crile on "Phylogenetic Association", and in 1915 by Dr. Keen on "The Dangers of Ether as an Anaesthetic."

These papers revealed the fact that not only did ether not remove the perils, other than pain, consequent upon operations, but that it added some new perils of its own. There was, as nearly always happens in human affairs, a price to pay. Part of this price, as Dr. Keen pointed out, is that the use of ether involves dangers both in its administration and in its operation. The first, he thought, was the greater and he quoted "the chief anaesthetist of one of our best American hospitals". "To what do you attribute the deaths from ether? was my question, and his reply began, 'Lack of skill in its administration*'. " Yet, lest any one should

*Ashurst, John, Jr.: Surgery Before the Days of Anesthesia. Semi-Centennial of Anesthesia. P. 29. 1897.

†Warren, J. Collins: The Influence of Anesthesia on the Surgery of the Nineteenth Century. P. 3. 1906.

*Dangers of Ether as an Anaesthetic. W. W. Keen. P. 5.

be alarmed at the possibility of death from ether, he went on to point out that, "the deaths are estimated in various statistics as being only one death in 4533 administrations in America, one in 5112 in Germany, one in 16,302 in Great Britain". For further reassurance he names two anaesthetists who "have to their credit respectively 22,000 and 20,000 administrations without a death" and, reviewing his own cases, did not "recall a single case of death, either immediate or remote, from ether*".

The dangers from the actual effects of ether are easily exaggerated, yet they are not imaginary, but real. In the same address Dr. Keen reminded his hearers that, in addition to a number of less familiar perils, the use of ether involves dangers to the heart, from various forms of heart disease; to the lungs, from paralysis of the respiratory center, from excessive flow of mucus, and from post-operative pneumonia. Though the actual records show that fatal results from these dangers are few and far between, they are not to be ignored. We may admit their existence without permitting them to cause us any alarm, but stimulating at the same time, meticulous care.

One of the important problems likely to be overlooked by the surgeon, preoccupied with the clinical aspects of his work, is not altogether physical. It is the problem of fear. Before October 16, 1846, a surgical operation was attended by two forms of fear, that of the knife and that of the pain. The second fear (of the pain) has been conquered by ether, but the fear of the knife remains, and, contrary to widely held opinion, is capable of the most disastrous consequences. It may be doubted whether any other emotion is as exhausting and devastating as fear. Those of you who recall Darwin's classic description of its workings will need no argument to convince them of its terrible nature. It is the testimony of physicians over the centuries that fear may even cause death. Dr. Crile, expressing a very modern view, points out that fear, producing the same effects as actual trauma, may drain to the last dreg the dischargeable nervous energy. There is, therefore, no room for surprise in the case mentioned by Dr. Keen of the patient whose fear resulted in death before the anaesthetic was administered, nor in the instance mentioned by Dr. Warren of the man who committed suicide rather than face an impending operation.

Against this profound form of fear which arises from the vivid imagination or representation of the injury he is about to undergo, ether anaesthesia is no defence. As Dr. Crile remarks, "Fear, like trauma, may cause physiologic exhaustion of and morphologic changes in the brain cells†." Against this effect no inhalation anaesthetic avails; "Ether is, so to speak," as he says in another place, "but a veneer; a mask that covers the deep suffering of the patient†".

*Ibid. P. 6.
†Phylogenetic Association in Relation to Certain Medical Problems. G. W. Crile. P. 38.

RESULTS OF EXPERIMENT

Admitting that ether as first used was inadequate to meet this situation, medical science has not been content to rest there. It has been continually experimenting and making progress. It has developed a means of combating the fear which is so distressing to patient and physician alike. It has created a preliminary or preparatory stage by the use of narcotics, which exclude fear until the anaesthetic is fully effective*.

To make this series of steps in the further development entirely successful, it is necessary in nearly all cases to invoke another aid—that of the confidence of the patient. This is a matter of personality. It has always been one of the great resources of the healing art, possessed in a high degree by physicians like Osler and surgeons like Kocher, inestimable in producing the trust and composure which make even difficult operations seem simple.

This confidence of the patient in the physician and the anaesthetist is especially to be desired in dealing with another and more modern form of fear which we have to meet and which we must learn to overcome.

It has been a common experience with me and always a matter of deep concern, as I know it has been with many others in both dental and medical practice, to find that a patient was facing the prospect of an operation with real and deep fear. Sometimes this amounted almost to terror and has recalled the suffering which patients underwent before anaesthesia was discovered. To be sure there are great differences. Whereas, prior to 1846, patients suffered not only from "apprehension of dangerous bleedings of wounds of vital parts and even sudden death", but also from "the dread of insupportable pain", now they are possessed by a new, a less poignant and yet a no less real fear, that of the surrender of consciousness, which, it seems to their troubled spirits, they may never recapture; or if they do, they may recover it in the midst of the operation and so suffer double distress.

I think this type of fear is partly the result of facing a new experience which is known not to be devoid of danger and partly the result of the legend of discomfort, arising from stories of suffocation caused by the somewhat unskilful early methods of giving ether. So, Dr. Keen declared, "No one, except by *force majeure*, shall ever

†Ibid. P. 7.

*Medical science has also devised a second step, and by the use of a local anaesthetic, such as novocaine, has succeeded in blocking off or isolating from the brain the territory of operation and thus preventing the exhaustion which may be so disastrous in its consequences.

again give it (ether) to me as on the first occasion, in 1863, from a closed cone saturated with ether, which almost suffocated me*.'' The form of fear we are discussing is also partly due to the very success of anaesthetization. It has intensified, one might say, the consciousness of consciousness and heightened its value. It has made people more aware of the nature of the experience of losing consciousness, so that, whereas, before ether, people lost consciousness, except in sleep, only as a result of accident or injury, now an ever-increasing number of people have surrendered their consciousness through the anaesthetic. There has developed in consequence a widespread familiarity with the process and very many people show a well-defined fear of it.

This form of fear especially calls for the remedy of personality. It can be successfully combated, I think, chiefly by establishing confidence in the surgeon and the anaesthetist. Dr. Keen advised that ''the anaesthetist should if possible always see the patient beforehand'' and ''thus establish an *entente cordiale* which will do much to prevent fear†''. The part of the surgeon is equally important. If he can set up in the mind of the patient that kind of trust and confidence which patients have felt in Maurice Richardson, Blake, Keen and Mayo, to mention no others, he may be sure that his patient will feel as Dr. Keen, after the experience of taking ether six times, declared he did. ''I would as lief,'' he said, ''lie down on the table and take ether as I would sit down at my table and eat my breakfast‡''.

TERMINATING ANAESTHESIA

There remains still a further, if only a rare and unusual, danger attending anaesthesia. This is that its action may be unduly profound, and, either on account of the debility of the patient or his exceptional susceptibility to anaesthetics, may give rise to alarming symptoms—even to the extent of imperiling life. This, of course, may occur with some patients in a very brief anaesthesia, whereas with others, of a different constitution, protracted periods of anaesthesia may be endured without even causing inconvenience. In the cases in which the effects of ether prove injurious, the need has long been felt of some means for quickly terminating the anaesthetic state. Equally familiar is the problem of averting, or preventing, the disagreeable sensations, nausea, etc., so often attending emergence from anaesthesia.

Until quite recently both these problems have remained unsolved and apparently insoluble, but *Palinaesthesia*—the recovery or restoration of normal sensibility after ether or other anaesthetic—is now being made the subject of definite and energetic research in several laboratories. Members of the teaching staff of the Harvard Dental School, with the active coöperation of the Medical School, are engaged in the effort to find a solution. It is quite premature to discuss these experiments in any detail at the present time. It may be said, however, that the experiments turn upon the effect of acids, given in fairly large quantities, upon a subject under anaesthesia. The preliminary observations and the results of early experiment give warrant for the belief that a valuable therapeutic agent may be developed, which—should these expectations be fulfilled—will be made available for the use of the profession as universally as ether itself.

All these problems give stimulus and encouragement to the spirit of investigation and the impulse to research which has long been widely disseminated among the medical profession and is now spreading with similar ardor among both the younger and older members of the dental profession. The occurrence of urgent problems and the eager spirit of inquiry taken together justify the hope that at no distant date we may be able to avail ourselves more completely of the bequest left to Harvard University some years ago by Dr. Henry Isaiah Dorr to establish a Chair of Research and Teaching in Anaesthetics and Anaesthesia. Such hopes are reinforced by the emphatic declaration of Dr. Keen that, ''It should be the duty of our medical schools and their hospitals *to instruct all students in anaesthesia and to give them experience* by having them administer anaesthetics under the supervision of their experts*,'' and his reminder that ''Giving ether is a serious business, always attended by possibility of danger. Life may depend on the carefulness of the anaesthetist; this is surely worthy any amount of trouble†.''

One of the speakers at an earlier celebration of Ether Day closed with the fervent expression of hope that before the Centenary of Anaesthesia shall have occurred on October 16, 1946, we might see further progress in this field. That hope I no less fervently repeat, with the added wish that the progress may be inspired by the high courage and foresight shown in this hospital from the beginning of anaesthesia, and that the dental profession may again contribute its full share in the achievement of that forward step.

*Dangers of Ether as an Anaesthetic. W. W. Keen. P. 8.
†Dangers of Ether as an Anaesthetic. W. W. Keen. P. 9.
‡Ibid. P. 8.

*Dangers of Ether as an Anaesthetic. W. W. Keen. P. 9.
†Ibid. P. 9.

THE ROBERT BRIGHAM HOSPITAL SURVEY OF CHRONIC DISEASE

BY H. ARCHIBALD NISSEN, M.D.*

THE following excerpt was part of the Seventeenth Annual Report of the Peter Bent Brigham Hospital published in the *New England Journal of Medicine,* August 13, 1931 (p. 363):

"The Physician-in-Chief, Dr. Henry A. Christian, also has an unusual report. He first calls to our attention the importance of a first-class hospital for chronic disease, where patients could be adequately cared for and investigative work take place comparable with that which is done in hospitals for acute disease. He thinks that perhaps the greatest need today in the way of hospitals is for such an institution and that 'to it should go the well-to-do and the poor. As developments in medicine and surgery have rendered the hospital the best place to be acutely ill in, whether rich or poor, so in the hospital for chronic illness will be found therapeutic measures of all sorts which cannot be provided in the homes of even the very well-to-do. Long since has this been recognized in the care of the tuberculous and the insane. It is equally true of all other sorts of chronic disease.

" 'Strangely enough, though the need is well nigh universal, little has been done anywhere to create such an institution as I am describing. For one with great wealth seeking to accomplish a great good for many people such a philanthropy should appeal. There is opportunity to create a new type of institution greatly needed in our land. I know of nothing that would yield a greater return. It easily would become a pioneer institution, a leader showing the way for other institutions to follow. It would need very large sums of money to make possible an ideal development, more money than so far probably has been put into a single institution at its inception.' "

This article directed the attention of the Staff of the Robert Brigham Hospital to the potentialities of a survey of the patients who had been in the public wards of the Hospital since its opening. The Robert Brigham Hospital was established definitely as a hospital for the treatment of chronic and incurable disease, so this statement was accepted as a direct challenge.

The hospital was opened April, 1914. It was leased by the Government from September, 1918 to 1923. During this period the patients, though in different quarters, were seen regularly by some members of the Staff. Treatment, necessarily, was largely symptomatic.

The survey figures fall naturally into three groups, patients admitted from 1914 to 1918; from 1918 to 1923; and from 1923 to December 31, 1931. This divides the seventeen years into three groups for comparative study. The duration of continuous hospitalization of patients varied from a few weeks to many years. The average period of hospitalization has decreased as experience in the treatment of chronic disease has increased. Originally this survey was limited to the customary presentation of statistical tables and charts analyzing the hospital work. Gradually, in pursuance of this plan, greater possibilities of study were appreciated. The value of following any group of patients over seventeen years was apparent. The need of learning the actual course of chronic disease, other than ultimate death, became evident. The following were some of the questions that arose. How can one determine the optimal length of hospital stay for the individual patient to avoid either over or under hospitalization, and still produce the quickest results in the shortest space of time? Which types and stages of chronic disease are hopeless, so far as progress or change is concerned? When will it be possible to detect the earliest stage of chronic disease? Is it better to keep the patient under continuous observation in the hospital for a long period, or is it better to break the time up into shorter periods, and send him home as soon as practicable, to readmit him to the hospital when necessary? Our impression is that the latter may be more valuable, in so far as the time spent at home is actually part of the rehabilitation or treatment. The effect upon the general morale and functional stimulus on the patient is usually beneficial.

Hospitals and the medical profession owe thanks to the efforts of Dr. E. A. Codman, who forced their attention twenty odd years ago to the importance and necessity of end-result studies in order to gauge accurately the measurement of any medical and surgical work. The end result in chronic disease is less easy to determine than that of surgical operation. Chronic disease has a longer duration and a more extensive involvement. The overlappings of serial complications have to be measured in different ways, and end-results cannot be determined in any given time. It became obvious in following the patients at the Robert Brigham Hospi-

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ADMISSION AGES AND RECOGNIZED DURATION OF DISEASE

DISEASE	No. Pts.	AGE 1-10	11-20	21-30	31-40	41-50	51-60	61-70	Over 70	Average Age	DURATION Mo.	1	2	Years 3	4	5	6-10	11-15	16-20	21-30	Over 30	Average Duration
1914 - 1918																						
Arthritis	84	3	5	13	21	15	19	7	1	47.3	6	7	7	10	10	5	18	9	5	6	1	7.9
Cardio-Circulatory	38	0	0	1	3	7	13	12	2	57.5	3	7	6	5	6	3	6	2	0	0	0	8.9
Cardio-Rheumatic Heart	22	9	5	2	3	3	0	0	0	19.7	4	3	3	2	2	1	2	3	1	1	0	6.0
Central Nervous	29	2	3	3	4	5	7	4	1	42.8	1	2	0	1	2	2	11	7	3	0	0	9.7
Syphilis	20	0	0	1	2	7	8	2	0	50.5	1	3	5	0	2	2	4	3	0	0	0	5.5
Tuberculosis	24	2	6	10	4	2	0	0	0	24.5	3	7	3	1	1	0	3	3	3	0	0	6.5
Remainder of Cases	70	4	5	6	11	9	14	11	10	48.0	12	16	8	6	7	3	9	2	3	3	1	5.3 yr.
TOTAL	287	20	24	36	48	48	61	36	14	41.3 yr.	30	45	32	25	30	16	53	29	15	10	2	6.4
1918 - 1923																						
Arthritis	39	6	3	3	8	11	5	3	0	36.8	3	9	3	4	6	2	9	2	1	0	0	4.5
Cardio-Circulatory	1	0	0	0	0	1	0	0	0	43.	0	0	1	0	0	0	0	0	0	0	0	2.0
Cardio-Rheumatic Heart	14	4	7	1	2	0	0	0	0	12.2	2	3	2	1	3	0	2	1	0	0	0	2.9
Central Nervous	1	0	0	0	0	1	0	0	0	41.	0	0	0	0	0.	0	0	1	0	0	0	14
Syphilis	0																					
Tuberculosis	4	0	2	1	0	0	0	1	0	30.2	0	2	0	1	1	0	0	0	0	0	0	2.3
Remainder of Cases	4	0	0	0	0	3	0	1	0	51.7	0	0	0	0	0	0	2	1	0	1	0	13.5
TOTAL	63	10	12	5	10	16	5	5	0	35.8	5	14	6	6	10	2	13	5	1	1	0	6.5

tal, many over a period of eighteen years, that this length of observation opened up an uncultivated field of study.

At the moment statistical tables and charts are being compiled from the data already collected and it is hoped that many interesting leads may develop. The original object of the survey, however, has gradually merged into a more permanent and continuous one, that is, a serial study of chronic disease, the hospital to function as a clearing house for the medical life history of each patient, extending from the recognized onset of the disease to the grave. A plan for the yearly check-up of each patient devised to accomplish this, is now under way. This yearly check-up is to be made whether the patient remains on the active list of the Robert Brigham Hospital Home Service, is referred to

ADMISSION AGES AND RECOGNIZED DURATION OF DISEASE

DISEASE	No. Pts.	AGE 1-10	11-20	21-30	31-40	41-50	51-60	61-70	Over 70	Average Age	DURATION Mo.	1	2	Years 3	4	5	6-10	11-15	16-20	21-30	Over 30	Average Duration
1923-1931																						
Arthritis	218	4	17	35	55	41	44	19	3	40.8	47	27	29	14	13	16	42	21	5	1	3	5.3
Cardio-Circulatory	15	1	1	1	1	4	4	2	1	41.0	6	2	0	1	1	0	4	1	0	0	0	3.9
Cardio-Rheumatic Heart	76	20	50	4	1	1	0	0	0	14.6	36	4	6	6	4	3	11	4	0	2	0	3.5
Central Nervous	7	1	2	2	2	0	0	0	0	19.4	1	2	0	0	2	1	1	0	0	0	0	4.1
Syphilis	0																					
Tuberculosis	16	2	8	1	3	1	0	1	0	18	1	6	2	4	0	0	1	1	1	0	0	1.7
Remainder of Cases	52	6	20	6	7	5	6	0	2	26.5	20	9	3	4	0	2	6	1	2	4	1	5.2
TOTAL	384	34	98	49	69	52	54	22	6	26.7	111	50	40	29	20	22	65	28	8	7	4	3.9
TOTAL GROUP																						
Arthritis	341	10	26	47	76	74	66	37	5	41.7	56	43	39	28	29	23	69	32	11	7	4	5.9
Cardio-Circulatory	54	1	1	2	4	12	17	14	3	52.6	9	9	7	6	7	3	10	3	0	0	0	8.9
Cardio-Rheumatic Heart	112	33	62	7	6	4	0	0	0	15.3	42	10	11	9	9	4	15	8	1	3	0	4.0
Central Nervous	37	3	5	5	6	6	7	4	1	38.0	2	4	1	4	3	0	12	8	3	0	0	9.0
Syphilis	20	0	0	1	2	7	8	2	0	50.5	1	3	5	0	2	2	4	3	0	0	0	5.5
Tuberculosis	44	4	16	12	7	3	0	2	0	24.8	4	15	5	6	2	0	4	4	1	3	0	4.7
Remainder of Cases	126	10	25	12	18	17	20	12	12	39.9	32	25	11	10	7	5	17	4	5	8	2	5.5
TOTAL	754	61	135	86	119	123	118	71	21	37.6	146	109	79	63	59	37	131	62	21	21	6	5.5

ADMISSIONS BY CHRONOLOGICAL GROUPS WITH COMPARISON OF 1931 STATUS

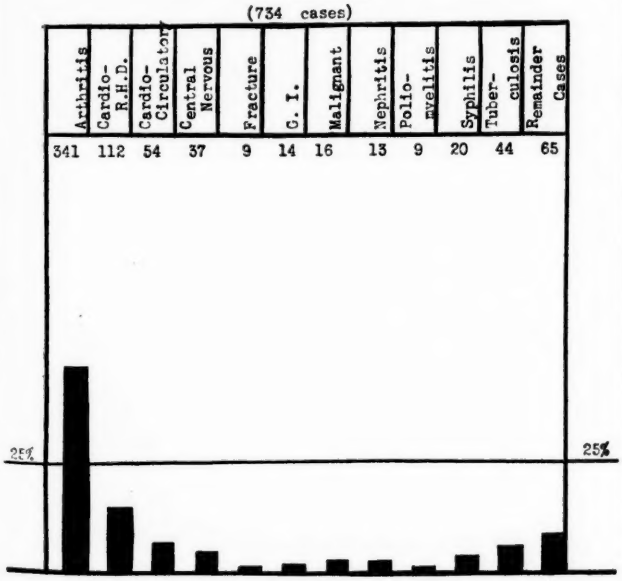
	1914 - 1918	1918 - 1923	1923 - 1931	TOTAL
ADMISSIONS	287	63	384	734
1931 STATUS				
UNLOCATED	43	9	30	82
LOCATED				
Dead	206	27	53	286
Hospital	4	1	40	45
Improved	22	18	222	262
Unimproved) Worse, or) Complication) Worse)	12	8	39	59
TOTAL Located	244	54	354	652

ADMISSIONS BY CHIEF DISEASE AND COMPARATIVE 1931 STATUS OF PATIENTS

DISEASE	NO. PTS.	1931 STATUS UNLOCATED	LOCATED Dead	Hospital	Improved	Unimproved	Total
Arthritis	341	35	88	29	150	39	306
Cardio-Circulatory	54	4	41	2	3	4	50
Cardio-Rheumatic Heart	112	13	40	5	51	3	99
Central Nervous	37	5	21	2	1	8	32
Syphilis	20	0	17	1	2	0	20
Tuberculosis	44	10	19	2	10	3	34
Remainder of Cases **	126	15	60	4	44	3	111
Total	734	82	286	45	261	60	652

**This group includes abscess, anemia, various bone diseases, congenital deformities, dermatological conditions, diabetes, endocrinal disturbances, fracture, gastro-intestinal, genito-urinary, and malignant diseases, nephritis, osteomyelitis, poliomyelitis and chronic respiratory tract infections. The number in each individual group was too small to permit separate analyses. Fifteen with malignant disease, 13 with nephritis, and 14 gastro-intestinal tract cases form the largest groups.

TOTAL SURVEY
COMPARISON of ADMISSIONS
by
CHIEF DISEASE
(734 cases)

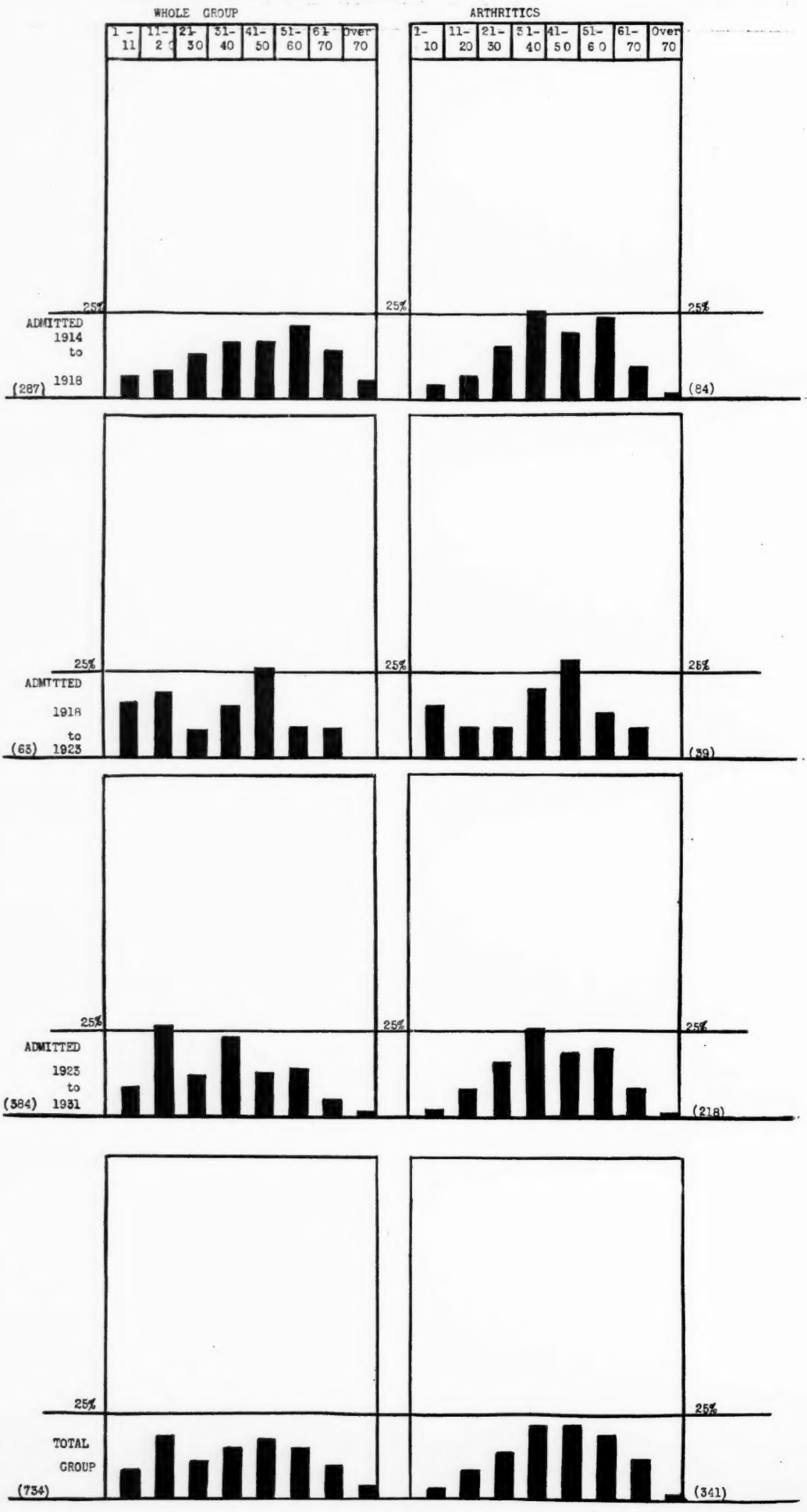


DEATH STATISTICS—CAUSES OF DEATH, AGE AT DEATH, DURATION OF DISEASE

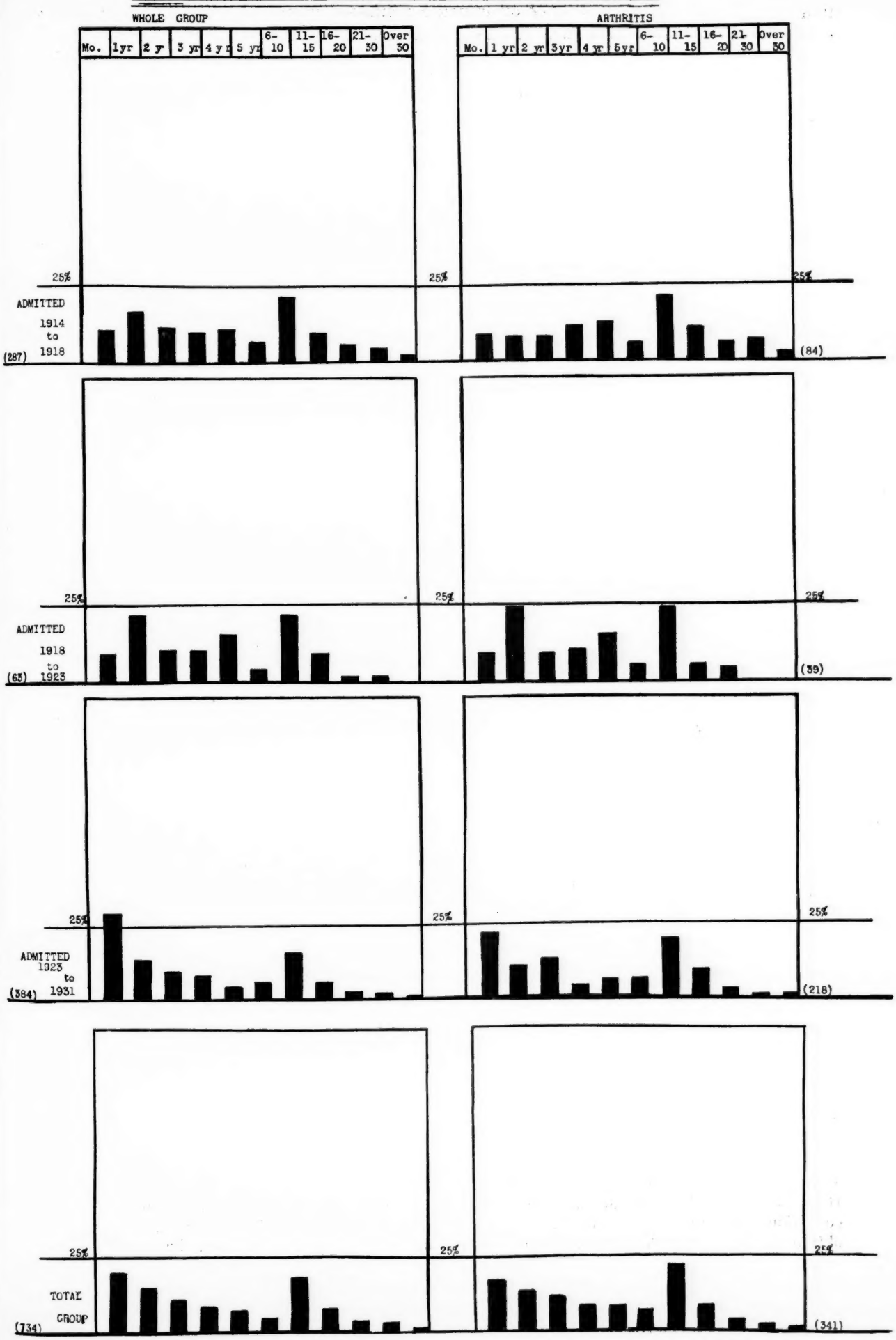
DISEASE	NO. PTS.	CAUSE OF DEATH: Abscess	Anemia	Cardio-Circulatory	Fulminating Rheumatic Heart	Central Nervous	Diabetes	Embolism	Erysipelas	G. I. Tract	G. U. Tract	Malignancy	Miscellaneous	Nephritis	Paget's Disease	Pneumonia	Respiratory, Chronic	Syphilis	Toxemia, Sepsis, Allergic	Tuberculosis	Uncertain	Accident	AGE at DEATH: 1-10 years	11-20 years	21-30 years	31-40 years	41-50 years	51-60 years	61-70 years	71-80 years	81-90 years	Over 90 years	Average Age at Death	DURATION of DISEASE at DEATH: Months	1 year	2 years	3 years	4 years	5 years	6-10 years	11-15 year	16-20 years	21-30 years	Over 30 years	Average Duration at death	Number of Autopsies
Arthritis	88	1	5	24	2		1	2	2	3		6		7		22			8	4	1	2			2	5	10	15	20	25	9	4		55.4	1	3	4	3	2	3	24	19	9	16	4	15.7	20
Cardio-Circulatory	41			28			2				1	1	1	3		5								1			2	14	13	4	1			58.1	8			5	5	6	10	8	1		1	6.7	14
Cardio-Rheumatic Heart	40				29			1			1		1	2		6				1				17	4	6	2	1						20.1	1			2	5	1	9	11	3	2		8.8	5
Central Nervous	21			4		5				1	1			1		7		2						1	2	5	1	2	9	1			52.6	1			1	4	1	4	5	2	1	1	16.0	7
Syphilis	17			4						2		1		3		1		5		1						1	2	8	6					56.7			1	2	2		1	4	4	2	1	14.4	5
Tuberculosis	19											1		1		1				17				4	6	5	2	1	1					31.5		1	2	5	1	2	5	1	2	2		870	5
Remainder of Cases	60	1	8	15						1		15	3	7	1	8	2		1				1	4	5	5	9	13	12	5	5	1	52.9	6	7	7	4	5	2	15	8	2	5	3	7.6	24
TOTAL	286	2	11	73	31	5	5	5	2	7	2	25	5	24	1	50	2	5	11	25	1	2	11	29	22	30	39	59	66	19	10	1	48.0	8	22	16	22	17	15	66	55	26	32	9	10.5	80

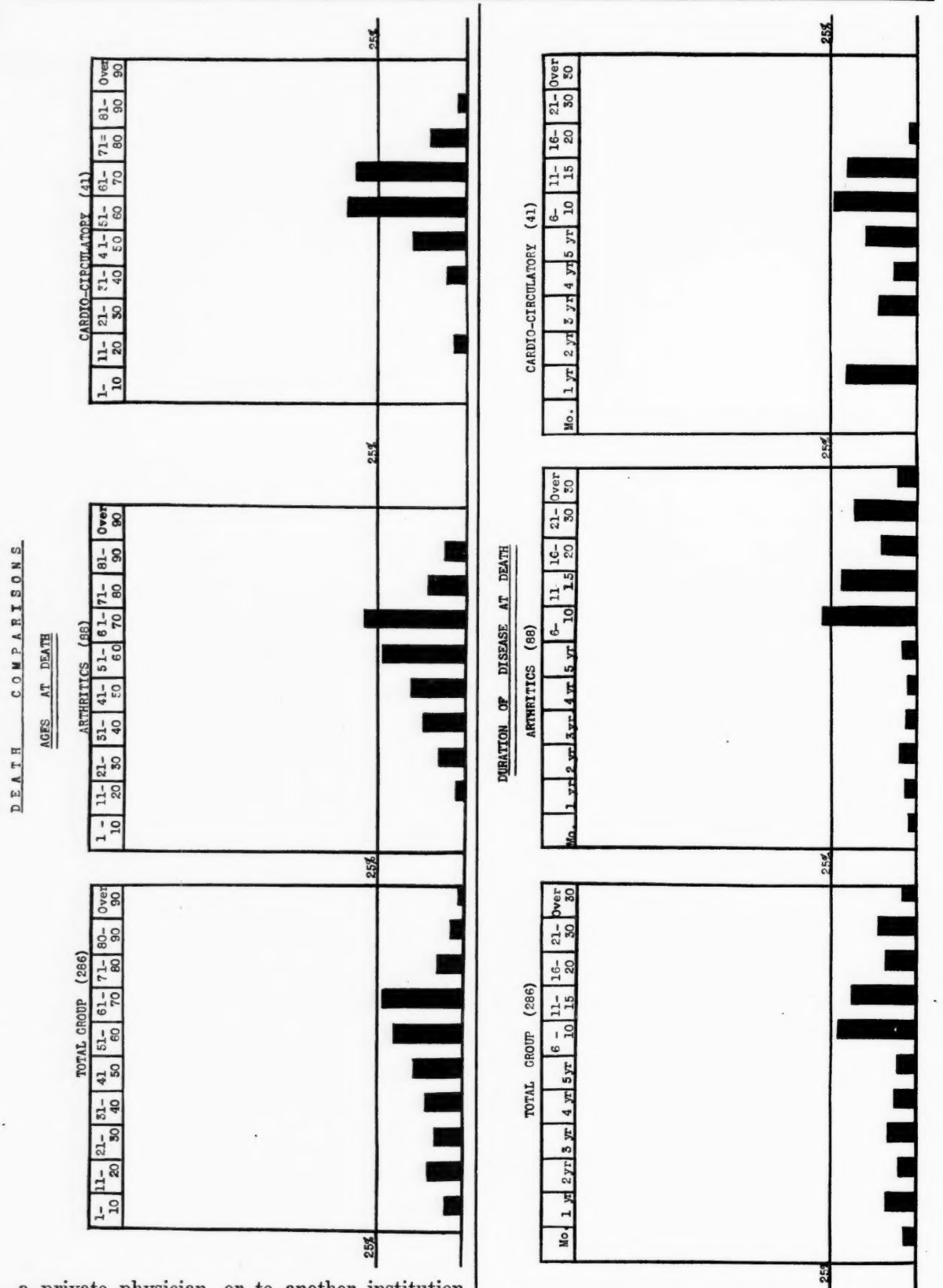
870 in the second column should read 8.0.

COMPARISON of AGES at ADMISSION



C O MPARISON of DURATION of DISEASE at ADMISSION





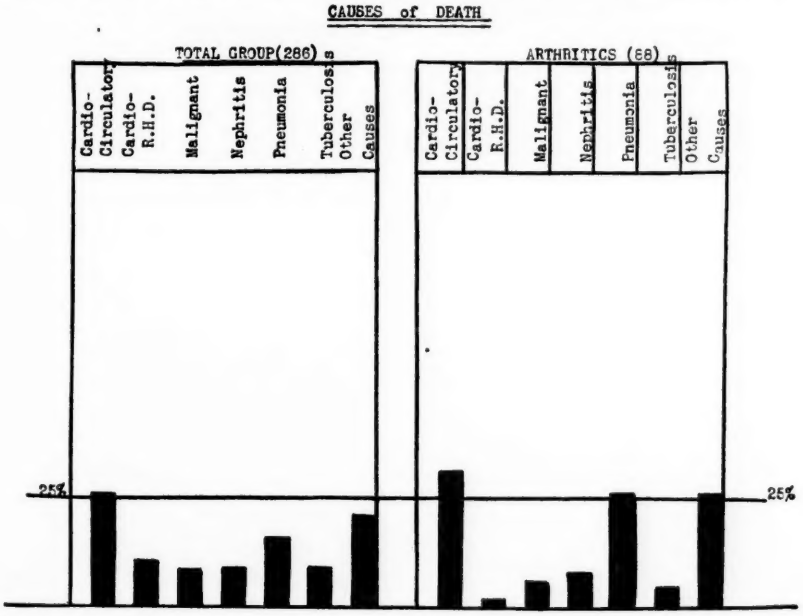
a private physician, or to another institution. It is to be literally a record of the patient's condition, mental and physical, at the same time obtaining the interval history of the past year's course of the disease. It is in no way the intention of the Staff to interfere with any treatment that the patient may be receiving else-

where. In this connection, the Staff wishes to express its sincere appreciation of the complete coöperation that has been shown by the individual members of the medical profession, hospitals, municipal and state institutions, and social agencies. Without their generous assistance the records would have been incomplete and the value of the work diminished.

The present survey covers comparisons of admission diagnoses and final diagnoses; duration of disease at admission and at death; ages and sex of patients; causes of death; ages at death; intercurrent and similar complications; forms of treatment; the results obtained in different diseases and types of individuals for a given length of time; x-ray and laboratory studies; in short the usual statistical groupings along ordinary lines of research. There are 734 patients in the first group studied. Discharges and deaths of those admitted since December 31, 1931, form already the nucleus for supplemental studies. The accompanying tables are offered solely as a beginning, or first attempt, to catalogue definite observations. It would be cumbersome to include in this article the various charts compiled to date. There are several outstanding points which may be of interest, chiefly to indicate the type of material with which the hospital has worked during the period covered. Of the 734 patients included in the survey, the females outnumber the males by 10 per cent, there being 400 females and 354 males.

It is difficult to decide the status of a chronic disease patient at any one period of observation. The table "Admissions by Chronological Groups with Comparison of 1931 Status" on page 953 makes one aspect of this clear, because if one reads the percentages of those improved in each chronological group the steady increase in the percentage of those improved is apparent; but one must add sufficient years to the second and third groups to make the three groups comparable on a basis of equal lapse of time from the time of admission to the Robert Brigham Hospital. Then, too, the decision as to what constitutes actual improvement is based upon two factors; first, the patient's personal estimate and expression of his range of functional activity, and his mental and physical comfort; and secondly, the doctor's estimate based upon his objective observations.

The table "Admissions by Chief Disease and Comparative 1931 Status of Patients" on page 953 is again the whole group of patients admitted to the hospital during the survey period, divided this time by the disease for which they came to be treated, and the comparison of the 1931 status. This shows clearly that the arthritics as a group form the largest number of admissions, and also that they show the next to largest percentage of cases showing improvement.



The last chart represents the known deaths. These are important because they form the real end-result group in chronic disease. From this group some sort of standard should be developed in time to guide future diagnosis, prognosis, and treatment of chronic disease. Another interesting study will be a chart of those who are still living and a comparison of this group with the chart of those who have been followed to death. The value of accurate prognosis and the value of various sorts of therapy should manifest themselves in a very definite manner.

This survey was undertaken with no thought of proving preconceived ideas. There has been no attempt to discuss etiology of disease; to name causative factors in the production of chronic disease; to alter or change nomenclature; to offer new classification. It has been an impersonal study of measurable observations and facts in an attempt to put a correct evaluation on changes found in patients with chronic disease during the lifetime of each patient. So

the real, immediate aim of the survey now is the yearly follow-up of each patient and the collection ad infinitum of pertinent facts and data, signs and symptoms, during the course of chronic disease, in the hope that from this collection another generation, if not this generation, shall have a better opportunity and more material upon which to build further the knowledge of chronic disease. Paul de Kruif in his recent book "Men Fight Death" quoted the following from Charles F. Kettering, and it seems particularly apt at this point:

"The Doctors tell us there are certain diseases that are incurable. Do you know what an incurable disease is? It is one that the Doctors don't know anything about. The disease has no objection to being cured at all."

In paraphrase, we might say: "There are certain diseases that are chronic. Do you know what a chronic disease is? It is one of which the Doctors don't know the full course. Chronic disease has no objection at all to being studied, treated, cured or prevented."

FOUR LIVING ADULTS WITH COARCTATION OF THE AORTA

BY BURTON E. HAMILTON, M.D.,* AND C. C. STEWART, JR., M.D.*

WE are reporting four living adult patients with coarctation of the aorta found in the course of private consulting practice, partly because of their comparative rarity but principally because they present several points of clinical interest.

CASE 1 was a single woman, aged 61. She had shown unusual executive ability and had had no chronic physical disability. She had been treated by a number of physicians for high blood pressure for many years. She was referred, to determine whether her cardiovascular condition justified hysterectomy for uncontrollable bleeding due to fibromyomata of the uterus.

Physical examination showed a woman, well-developed above the waist, comparatively under-developed below. An artery, which appeared to be the left carotid, was very prominent. The subclavian, brachial and radial arteries on the left could not be found. On the right, the brachial and radial arteries pulsated strongly. The blood pressure in the right arm was 160/100 mm./hg. Both femoral arteries pulsated faintly. The popliteal arteries could not be made out. The dorsalis pedis artery pulsations were obliterated at about 120 mm./hg. with the cuff above the knee. The heart showed a loud systolic murmur, loudest at the base and toward the suprasternal notch. It was heard clearly over the spine from the seventh cervical vertebra to the lumbar region. (The patient had a hysterectomy without ill effects).

Roentgen ray examination showed slight enlargement of the heart. The ascending portion of the aorta and the aortic arch were normal, except for slight narrowing of the arch at the bifurcation of the trachea. There was a cone-shaped narrowing of the aorta beginning at the upper portion of the thoracic aorta and extending the entire length of the descending aorta. In the abdominal portion the width of the aorta, as demonstrated by the calcified plaques, was about one-half normal. Though these findings show beyond question a coarctation of the aorta, the usual rib changes could not be demonstrated.

CASE 2 was a married woman, aged 32, of unusual intelligence who had been treated for sterility for one year before success. She knew that she had had hypertension and had been treated for this by her family physician for a number of years, but concealed this information from her obstetrician fearing he would advise her not to become pregnant if he knew of it. She had had no disability and had taken reasonable exercise. She was three months' pregnant when, following discovery by her obstetrician of her hypertension, she was referred for an opinion as to the advisability of continuing the pregnancy.

Physical examination showed a well-developed woman. The carotid, brachial and radial arteries pulsated strongly. The blood pressure in both arms varied between 180/110 and 210/110 mm./hg. The femoral arteries pulsated feebly. The pulsation in both dorsalis pedis arteries could be faintly felt. It was not possible to feel the popliteal arteries. Attempts to take blood pressure in the legs were largely unsuccessful, but the systolic pressure certainly was not more than 100 mm./hg. with the cuff above the knee. At that pressure no pulsations could be felt in the dorsalis pedis artery. There was a loud systolic murmur heard over the heart, loudest at the base and transmitted to the suprasternal notch. This was heard clearly down the spine from the seventh cervical vertebra to the lumbar region. (The pregnancy was not successful since the fetus died in utero toward the end of the second trimester.)

Roentgen ray examination showed moderate enlargement of the heart. There was no appreciable narrowing of the aortic arch or the upper portion of the descending aorta. At the level of the eleventh dorsal vertebra there was some narrowing of the aorta. There was a deformity of the proximal third of the right fifth and seventh ribs and the left eighth rib characteristic of enlarged costal vessels secondary to coarctation of the aorta.

CASE 3 was a married mulatto woman, aged 22, of unusual intelligence. She was several months' pregnant and was referred to determine whether her pregnancy should be interrupted because of hypertension.

Physical examination showed a well-developed woman who had had no physical or other disability. A prominent artery appeared to the right of the front of the neck above the suprasternal notch, going upward and slightly to the right for about two inches and disappearing into the neck. It was about one half inch in width. It pulsated vigorously. The brachial and radial arteries pulsated strongly. The femoral arteries pulsated much less vigorously than seemed normal. The popliteal arteries could not be felt in either leg. The dorsalis pedis arteries could just be made out. The blood pressure cuff around the left thigh obliterated the dorsalis pedis artery pulsations at 80 mm./hg. The systolic blood pressure in the right arm was recorded at different visits of the patient from 150 to 206 mm./hg. The diastolic pressure varied from 90 to 112 mm./hg. Both the systolic and the diastolic pressures were

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usually found to be more than ten points lower in the left arm than in the right. The heart had a forceful beat which moved the chest wall slightly. A harsh systolic murmur was heard over the precordium, much louder at the base and in the direction of the suprasternal notch. This murmur was clearly heard posteriorly over the upper three dorsal vertebrae. An aortic diastolic murmur was heard over the sternum at about the level of the second rib. (The patient had an uneventful pregnancy and delivery. The mother and baby were both well four years later.)

Roentgen ray examination showed slight enlargement of the heart. The aorta was small. There was marked deformity of the inferior borders of the ribs characteristic of enlarged costal arteries secondary to coarctation of the aorta.

CASE 4 was a male student, aged 18. He was an unusually good student, a good swimmer but a poor runner. He had been treated for hypertension by his family physician and a consultant in cardiovascular diseases.

The physical examination showed him to be better developed above the waist than below. Both carotid, sub-clavian and brachial arteries pulsated strongly. The blood pressure in both arms was 170/84 mm./hg. The arteries in the legs pulsated faintly. The systolic blood pressure in the legs was 95 mm./hg. Examination of the heart showed a doubtful enlargement. On auscultation, there was a loud systolic murmur, loudest at the base and transmitted toward the suprasternal notch. It could be heard easily over the spine from the seventh cervical vertebra to the lumbar region.

*Roentgen ray examination showed the heart measurements within normal limits. The shadow of the lower portion of the descending aorta was narrowed. There was some deformity of the inferior margins of the right and left fifth ribs, and the right sixth and seventh ribs, due to enlargement of the intercostal arteries secondary to coarctation of the aorta.

Conclusions: Coarctation of the aorta appears in these cases not as a postmortem or lecture room curiosity, but as a rare condition found among patients who do not appear strikingly unusual. Rare as it is, it has been described and discussed widely. Undoubtedly, the diagnosis and physical signs of coarctation of the aorta and the fact that it can readily be mistaken for essential hypertension are known to many physicians who have never seen a case with it. Yet these four cases had been diagnosed as and treated for essential hypertension by men of wisdom and experience most of whom could have given a fair description of the diagnosis they overlooked. How then can we guard against this error? Evidently something more than the usual information is needed.

In each instance, recognition of these four cases was provoked because a loud systolic murmur, heard at the base and transmitted toward the suprasternal notch drew attention to the mediastinum. Certainly loud systolic murmurs at the base of the heart are not particularly uncommon. And they do not all, by any means, indicate mediastinal pathology. But it is only too easy to overlook pathology in the mediastinum, and experience should make us wary of overlooking any sign suggesting it.

The suggestion of mediastinal pathology given by this murmur fortunately led to auscultation over the upper dorsal vertebrae (since this procedure sometimes gives a little information confirming mediastinal pathology) and to finding there the systolic murmur extraordinarily well transmitted. This led to consideration of pathology of the aorta, and so to the diagnosis.

These cases then suggest, perhaps, that coarctation of the aorta should be considered in every case before a diagnosis of essential hypertension is finally made. Certainly they teach clearly that one should make it a rule to search at least all cases of apparent essential hypertension who have a murmur such as these cases presented to determine whether there is a comparatively high blood pressure and vigorous pulsations in the arteries of the neck and upper extremities contrasting with a comparatively low pressure and faint pulsations in the arteries of the lower extremities. (Over-pulsation of the intercostal arteries has been described as a prominent sign with coarctation of the aorta, but it was not easily demonstrable in these four cases. Probably this sign is prominent in cases that have a more marked degree of narrowing of the aorta than was present in these cases.) If the tension in the radial artery is higher than in the dorsalis pedis artery, Roentgen ray examination should be made. In three of our four cases, Roentgen ray examinations clearly showed rib changes which are characteristic of coarctation of the aorta.

It is important to know that though these plates were read routinely by roentgenologists of wide experience, in none of the three cases were the characteristic rib changes noted at the first reading. We should then ask our roentgenologists to search for characteristic rib changes in suspected cases.

Two of the cases (1 and 3) showed gross anomalies of the neck vessels on inspection. This alone should serve to induce careful study of the arteries before a definite diagnosis is made.

The presence in Case 3 of an aortic diastolic murmur might mislead one into suspecting an acquired cardiovascular lesion. Reported cases[1], however, have shown that faulty development of the aortic valve associated with coarctation of the aorta, in some cases is accompanied by incompetency of the valve and a diastolic murmur.

It is interesting to note that none of these patients suffered any disability. Case 1 had reached the age of 61.

*The Roentgen ray reports of all four cases are abbreviations of readings made at our request by Dr. John W. Meachen, Boston.

REFERENCE

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A PERIOSTEAL ELEVATOR FOR THE FIRST RIB

BY RICHARD H. SWEET, M.D.*

IT is now a well-established principle in thoracic surgery that, in order to secure the maximum of collapse in the operation of thoracoplasty, the resection of a portion of the first rib is essential. The technical difficulty of this portion of the operation is apparent to those who work in this field. Reference to the anatomy of the region of the first rib will recall that this rib, as approached from behind, lies at the anterior extremity of a space, bounded medially by the vertebral column, laterally by the scapula and its muscular attachments, superiorly by the contents of the apex of the axilla and the base of the neck, and inferiorly by the second rib. After exposing this region the posterior border of the first rib is found at the very depths of a deep narrow operative field. In this limited space, it is practically impossible to use the standard rib periosteal elevator because of its shape. The ordinary straight elevators used in general surgical work are unsuitable, not only because of their lack of adequate curve, but also because of the danger of their use in such close proximity to the subclavian vein and the important structures in the apex of the axilla.

In addition to the impossibility of obtaining a wide exposure the cross-sectional contour and the direction of the curve of the first rib add materially to the difficulty. This rib is broad and thick in this region; its curve is short; and, what is most important to remember, its flat surfaces are superior and inferior instead of anterior and posterior as they are in the other ribs. These anatomical characteristics make the use of any of the ordinary periosteal elevators awkward, and added to the difficulty, in the average case, of securing sufficient exposure in which to manipulate an instrument, they make it a tedious and somewhat hazardous task to clean a proper segment of the first rib for resection.

The first rib elevator of Sauerbruch, we believe, is especially useful to hook around the anterior border of the rib once the periosteum has been elevated, but because of the acute curve of its end we have not found it entirely satisfactory as a periosteal elevator.

A realization of these facts leads to the thought that an instrument might be made to obviate the above difficulties of the operation. The result of this attempt is a rather stoutly constructed elevator of sufficient length to reach the rib easily and heavy enough to make its manipulation easier. The chief advantage of this instrument, we believe, lies in the fact that, unlike the ordinary rib periosteal elevators, it has only one curve. This is a shallow slightly eccentric curve made in the long axis of the instrument and designed to facilitate access to the inferior and superior flat surfaces of the first rib. It is likewise most useful in clearing the attachments to the anterior border of the rib, as it can be easily guided under from behind and turned with the curve crosswise of the rib. It has been found, also, to be useful as a lever to lift up the cut end of the rib so as to make the second cut, thus rendering this part of the procedure easier and safer.

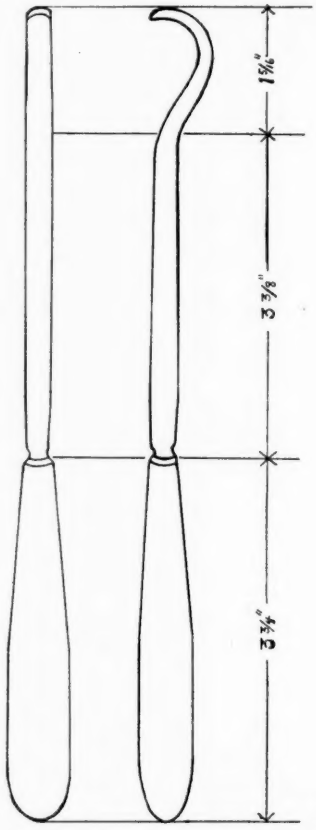

Diagram (reduced ½) illustrating size and shape of first rib periosteal elevator.

The field of usefulness of this instrument has recently been enlarged by the members of the Circulatory Service at the Massachusetts General Hospital, who have found it an aid in the resection of ribs through the small deep exposure used in the operation of dorsal sympathetic ganglionectomy.

*Sweet—Assistant in Surgery, Massachusetts General Hospital. For record and address of author see "This Week's Hospital," page 966.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 19451

CONVULSIONS WITH RECOVERY IN A MAN OF TWENTY-NINE

PRESENTATION OF CASE

DR. ROY B. COHN: A twenty-nine year old white American chauffeur came into the hospital complaining of headaches of two weeks' duration.

Two weeks before entry while lying on the couch he suddenly lost consciousness and remembered nothing further until the next day. Friends told him that for two hours he tossed about in an uncontrollable manner, then dropped off to sleep after having vomited several times, and slept for seventeen hours. When he awoke the next day he was perfectly well except for severe headache. During the two weeks before entry he had right-sided ptosis which lasted seven to ten days and then cleared up. This he thought came on when he tried to read.

His course before entry, except for headaches and a vague history of slight weakness of the whole right side for a short time, was negative.

On entry the physical examination showed a well developed and nourished man sitting up in bed in no discomfort. The positive findings were bilateral papilledema of two diopters, right facial weakness and slight hyperactivity of the reflexes on the left side. The spinal fluid showed 160 red cells, half of which were crenated. The dynamics were normal. The remainder of the laboratory work was normal.

He got along perfectly well except for headaches until the tenth day. That morning he suddenly had an attack of severe headache with projectile vomiting. Lumbar puncture showed grossly bright bloody fluid. He became very drowsy and had a few generalized convulsions. A second puncture gave very bloody fluid which clotted on standing. He went into coma and died at 2:10 that afternoon.

CLINICAL DISCUSSION

DR. W. JASON MIXTER: I think the history and physical examination have been covered very completely. There is this to be said. I saw this patient two days before his admission to the Massachusetts General Hospital at the Cambridge Hospital. My note shows that at that time he had definite weakness on the whole right side of the body. The estimated loss of strength in the right leg was fifty per cent, so that he had a very definite right hemiparesis.

Our diagnosis was subdural hemorrhage, probably spontaneous, of unknown cause. Whether or not it was due to underlying neoplasm we felt could not be stated. We thought it was more probably on the basis of some small aneurysm than anything else. The recurring severe hemorrhage from which he died seemed to confirm that diagnosis to a certain extent.

DR. HENRY R. VIETS: I think the only thing to add is perhaps to emphasize the suddenness of the onset of the final episode. This man had well marked signs of an acute hemorrhage into the subarachnoid space before he came to the hospital, presumably on a basis of an aneurysm. This cleared up practically entirely; as a matter of fact he was about to be discharged from the hospital on the day when he suddenly collapsed again and died within a few hours. That made us feel that we got him up a little too quickly after the original attack; but his general health was so good—he was up and walking about the ward—that we felt no hesitancy in ordering his discharge.

DR. FULLER ALBRIGHT: I understand that he had weakness on one side of his body. He had ptosis. He did not have any eye trouble; his eye was not affected. There is no doubt that he had a rupture of a small aneurysm on a cerebral vessel; the question is where.

DR. MIXTER: On which side was the ptosis?

DR. VIETS: It was on the right.

DR. ALBRIGHT: I suggest that the aneurysm was in the middle cerebral vessel where it bifurcates.

CLINICAL DIAGNOSIS

Cerebral hemorrhage, unlocalized.

ANATOMIC DIAGNOSES

Ruptured aneurysm of anterior cerebral artery.
Intracerebral and subarachnoid hemorrhage.
Arteriosclerosis, aortic, slight.
Old mesenteric tuberculosis.
Anthracosis, moderate.

PATHOLOGIC DISCUSSION

DR. CHARLES S. KUBIK: Nothing was found to explain a ptosis.

Of some interest but probably of no etiologic importance is an anomaly of the arterial supply. Both anterior cerebral arteries came from a short common trunk, a branch of the left internal carotid artery.

Just beyond the bifurcation there was a tiny saccular aneurysm between one and two millimeters in diameter with a slit-like rupture of its wall. Where it rested against the lower mesial surface of the left frontal lobe blood had broken through the brain tissue into the anterior horn of the left lateral ventricle. All of the ventricles

and the cisterna magna were filled with blood. The ependymal walls had a ragged, shredded appearance and the tissues just outside the lateral ventricles were soft, almost mushy.

DR. TRACY B. MALLORY: As is usual in these cases, there were no other pathologic findings outside the central nervous system. He had a few old calcified mesenteric glands, presumably tuberculous, and he had some early atheroma of his aorta, slightly more than might be expected at the age of twenty-nine, but not much.

DR. KUBIK: No other aneurysms were found. The cerebral arteries do not appear to be sclerotic. Aneurysms like this are the most common source of subarachnoid hemorrhage in young people. Syphilis and arteriosclerosis may be ruled out as possible etiologic factors in most cases. They seem to represent some inherent weakness, possibly a congenital defect, of the vessel wall. They are usually found on the anterior or middle cerebral arteries not far from the internal carotid, and not infrequently they are multiple.

DR. G. COLKET CANER: How long did he have choked disks?

DR. MIXTER: When I saw him in Cambridge ten days after the onset of the affair he definitely had choked disks of a mild grade.

DR. CANER: Did they subside before he got out?

DR. MIXTER: Yes. You see the first episode, although he had a paresis, was associated with unconsciousness and thrashing about, and perhaps even more than that. He got up and ran about the house dragging his leg after him. He was very much out of the picture mentally, besides having paresis of the whole right side of the body.

DR. CANER: How soon was the lumbar puncture done that showed 160 red cells?

DR. MIXTER: Four days after he entered the hospital.

DR. MALLORY: I should like to ask about the prognosis of these cases. If you have a typical case of subarachnoid hemorrhage which starts up promptly, as this apparently did, what is the usual course? How much do you have to fear a succession of attacks?

DR. WYMAN RICHARDSON: If you take a group of about ten young persons without any evidence of vascular disease or any other disease, in whom you get a clear-cut picture of spontaneous subarachnoid hemorrhage presumably due to ruptured aneurysm, out of the ten cases three fourths live more than five years. About half of the remainder are lost sight of and the other half are dead. That is a rather better prognosis than you would expect and certainly better than if you took the entire group of subarachnoid hemorrhages regardless of age and condition.

DR. MIXTER: I am rather surprised that the prognosis is as good as that. I supposed it would be worse.

A PHYSICIAN: How many of these ten had more than one hemorrhage?

DR. RICHARDSON: At least half of those having hemorrhage a second time died. I think that is probably important in prognosis. I do not know. I should say that those who lived did not have more than one. If they do have recurrent hemorrhages the prognosis is not so good.

DR. JAMES B. AYER: You have no right to assume that those were all aneurysms.

DR. RICHARDSON: Not at all.

DR. AYER: Rather more often you do not find it than you do?

DR. RICHARDSON: Except when there is no evidence of any other cause. These aneurysms are so very small that it seems reasonable that they may be easily overlooked.

DR. MALLORY: There is no question but that they are very easy to miss at autopsy. As in this case, the final hemorrhage causes so much destruction of the brain tissue that the wall of a small delicate aneurysm could easily be missed.

CASE 19452

DYSPHAGIA FOR FORTY-ONE YEARS

SURGICAL DEPARTMENT

PRESENTATION OF CASE

DR. A. GORDON GAULD:* This is the case of a sixty-two year old American widow who entered the hospital with the complaint of dysphagia of forty-one years' duration.

The present illness began at the age of twenty-one, when she had, according to her history, a tapeworm. A half ounce of turpentine was given by her doctor at that time to cure her of the tapeworm, apparently with complete success. Three months after this she had difficulty in swallowing, could take no solid food at all and had difficulty with liquids. There was no pain.

She came to the Outpatient Department forty-one years ago. Bougies were passed and no obstruction was demonstrated in the esophagus. Nitroglycerin was recommended. She took one hundredth of a grain of nitroglycerin before meals, was able to swallow very well and got along with varying success for forty-one years in that way. During that time she went to a great many doctors who examined her and found nothing wrong.

Four months before entry she began to have very frequent colds with considerable cough and some respiratory distress and orthopnea. This became increasingly severe. She lost a great deal of weight during the four months and became so weak that she had to give up work.

*Junior interne on the East Surgical service.

When she came in here the physical examination showed a fairly well developed but poorly nourished woman with evidence of loss of weight. The heart and lungs were not remarkable. The chest was clear; but on both sides of the neck just above the clavicles and above the apices of the lungs there was definite bulging, particularly on coughing, and on the left definite tympany.

Blood studies were normal.

X-ray showed an enormously dilated and tortuous esophagus, but barium did pass through into the stomach.

It was felt at this time that she should be sent to the Eye and Ear Infirmary and have an esophagoscopy and possibly an attempt to pass another bougie. She was sent to the Infirmary, but there they thought esophagoscopy unsafe, so after staying four days she returned to us. By this time she had still more difficulty in getting anything at all through. She had persistent vomiting and cough. She was seen by a medical consultant who advised another barium examination after nitroglycerin, which it was thought would help. Even with nitroglycerin nothing went through. Another attempt to pass a bougie also failed. Surgery was advised.

For twenty-four hours after operation she did very well. Fluids passed much better than at any time since she entered the hospital. Then she began to do more and more poorly, taking less and less by mouth and vomiting frequently. Repeated aspirations were done. Amounts varying up to sixteen ounces were retained in the esophagus. It became evident however that she was making no gain in weight in spite of the attempt to increase the flow through the esophagus by having her sit up straight. Two weeks after operation an attempt was made to pass mercury bougies. They went through very easily for a few days. She ate, took soft solids and kept a very good fluid balance.

About the nineteenth day after operation she began again to vomit everything she took and once more large quantities were retained in the esophagus in spite of the passing of bougies three times a day. She became very much weaker and was evidently losing ground. On the twentieth day she was slightly irrational and took nothing by mouth. Three days later she was still losing ground steadily. The only hope was further operation. That was scheduled, but the succeeding day she failed more rapidly and on the morning operation was planned she died rather suddenly.

Clinical Discussion

Dr. Gauld: The operation suggested was an attempt to do some sort of anastomosis between the lower end of the esophagus and the stomach.

At operation the cardiac orifice of the diaphragm was easily exposed after turning up the left lobe of the liver and the opening was enlarged and two inches or more of esophagus pulled down through the orifice of the diaphragm. A definite point of constriction was found but no fibrous stricture. A finger could be passed through readily by invaginating the esophagus through the cardiac orifice. During the operation considerable bleeding occurred at the base of the spleen. When that was removed the bleeding stopped. It was felt that a later operation could be done but that very likely enough had been done, since the finger passed through easily. A bougie was put down through the mouth and passed readily into the stomach. We then tried to pass a nasal tube, but it could not be put down. We thought possibly enough benefit had been obtained by the operation without a second stage. She was transfused and sent to the ward in good condition.

Dr. Aubrey O. Hampton: This film was taken before operation. An attempt was made to fill the esophagus with barium, the esophagus being already filled with water, food and saliva perhaps. The barium is seen in a very unusual shape, being scattered in irregular masses throughout all parts of the esophagus. The esophagus is about 10 centimeters in diameter, quite tortuous and elongated. The orifice is apparently below the diaphragm. The left side of the diaphragm is obscured by dullness that looks like fluid. There is a queer deformity of the fundus of the stomach also, as though pressed upon from the upper left side. In this view dullness in the left lung can be seen and she also has multiple areas of density in the lungs, at the bases particularly. We see that mottling quite often in obstructions to the esophagus.

We have observed barium passing into the trachea during examination when the esophagus is obstructed, and we assume that all of that dullness in the lung is aspirated food and fluid. The first time I saw it I thought the patient was desperately ill. He was not ill at all. The barium that is aspirated is not coughed up very readily and does not seem to produce any marked coughing; one or two paroxysms and it is all over.

The film taken here to show the duodenal tube shows it above the diaphragm, or what would correspond to the position of the diaphragm. The dullness in the lung is increased markedly.

Dr. Arthur W. Allen: This patient was in quite a serious stage of starvation deficiency disease at the time of her operation, but she stood the operation pretty well. The question whether or not there was a definite fibrous stricture in the region of the cardia, possibly based on her drastic medication in youth, was I believe pretty well ruled out, as there was nothing we could identify as definite scar. At first it was impossible to get the finger up through the fundus of the stomach and through the cardiac orifice,

but after freeing it, bringing the esophagus down and cutting some of the fibers of the diaphragm it was perfectly easy to get a finger through. Also, on the table a bougie passed readily into the stomach through the esophagus.

It was not planned at this operation to do more than free the cardiac end of the stomach and bring some of the esophagus down below the diaphragm. An immediate attempt at suturing between the stomach and the esophagus is a pretty dangerous one. It is occasionally done successfully, but men who have had a good deal of experience in this field seem to believe that the danger of mediastinitis is so great that any operation opening the esophagus should possibly be left for a second procedure. That is what we had in mind. Interestingly enough Scrimger has reported three cases similar to this, where after freeing most of the cardiac end of the stomach and bringing some of the esophagus down below the diaphragm the patients have made good recoveries but have had to use bougies. These patients, like this one under discussion, had not been able to get bougies through before operation. His patients were all younger than ours and perhaps in better condition to start with. In one other case which he reported, his first attempt to relieve this condition, he did an immediate plastic operation between the lower end of the esophagus and the cardiac end of the stomach. That resulted in a fatal mediastinitis.

Our patient was better for a few days; then nothing would go through the cardia. We kept feeling that perhaps she would be able to get along with bougies without any further operative procedure. She was not a good risk and we dreaded operating on her again. In retrospect we realize however that this woman should have had a gastrostomy or jejunostomy ten days or two weeks after operation, when it was found that our lysis of the cardia was not going to be adequate.

CLINICAL DIAGNOSES (FROM HOSPITAL RECORD)

Cardiospasm.
Myocardial insufficiency.

ANATOMIC DIAGNOSES

Cardiospasm.
Esophageal dilatation, marked.
Operative wound, splenectomy with lysis of the cardiac orifice.
Esophageal erosions at the cardiac end.
Infaret of the left adrenal.
Old healed pleural and pulmonary tuberculosis.
Chronic vascular nephritis, slight.
Endometrial polyp.

DR. TRACY B. MALLORY: The autopsy provided us with a most extraordinary specimen. This entire mass is the esophagus, which is dilated to six or seven times the ordinary size. Coils pass back and forth across the vertebrae, sometimes on one side and sometimes on the other. The cardiac orifice is at the base. It appeared to be about one centimeter in diameter at the time of autopsy and was pretty stiff.

We have not as yet a histologic examination of that, but judging from other cases that I have seen, not of such long duration as this, we may expect to find fibrosis and chronic inflammation, not much more. The usual case is pretty negative histologically. Such changes as we may find here are more probably the result of a very long standing condition rather than to be interpreted as a causal condition.

A SURGEON: We could put an index finger through the cardiac orifice.

A PHYSICIAN: How thick was the esophageal wall?

DR. MALLORY: Not greatly increased in thickness. It measures about normal thickness. On the other hand, with a dilatation like that a normal esophageal wall would be reduced to paper shell, so it must be hypertrophied.

There were some very minute shallow ulcerated areas in the cardia and at the base of the esophagus. It did not seem that they could be of any great importance.

There was a slight old healed tuberculosis of the lungs and nothing else.

DR. ALLEN: Did you find any immediate cause for death other than inanition?

DR. MALLORY: No, nothing that seems significant at all.

DR. HAMPTON: How do you explain that left base there,—the distance of the fundus of the stomach from the lung? There was no fluid or anything there?

DR. MALLORY: No.

DR. HAMPTON: This is the preoperative plate.

DR. MALLORY: Yes; it was taken quite a long time before death.

DR. ALLEN: At the time of operation the spleen was removed and there may have been a reaction, but it would not explain this.

DR. HAMPTON: The spleen and liver are there. This is before operation.

DR. MALLORY: The spleen was not significantly enlarged?

DR. ALLEN: No; it was small but adherent to the fundus of the stomach in such a way that it interfered with the operative procedure and the easiest thing was to take it out. By getting rid of the spleen and turning up the left lobe of the liver we had a very good exposure.

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MENTALITY AND THE RIGHT CEREBRAL HEMISPHERE

IT has recently been shown that the right cerebral hemisphere in man can be completely removed, except for the basal ganglia and their underlying structures, without discernible loss of mental processes. In the case reported by Dr. W. E. Dandy[1, 2] the patient survived two years and two months, and in a similar case described by Dr. W. J. Gardner[3] the mental and physical state of the patient could be studied one year and eight months after the operation. Dr. Dandy's patient could carry on his occupation as a preacher and conduct services on Sunday in spite of the handicap of his left hemiplegia and Dr. Gardner's patient, less paralyzed, was able to go up and down stairs without aid and did her housework and went shopping. In neither patient was there any definite loss of the mental faculties which the family or friends could notice.

These extraordinary findings only serve to make more mysterious the relationship between mind and body. It would appear from these observations that the right cerebral hemisphere, in right-handed people at least, so similar anatomically to its fellow, serves only the function of motion and sensation and does not, as often supposed in the past, contain regions primarily associated with the working of the mind. It must, of course, be noted in these remarkable cases which have thrown so much light on the physiology of the brain, that the centers for our vegetative life, so aptly termed by Cushing the "mainspring of primitive existence", are preserved. Our great overlay of right cerebral cortex, a comparatively recent addition to our central nervous system from the philogenetic point of view, seems to be of little importance as a center for the mind and in consequence our left cerebral hemisphere stands out as the area which carries the great burden of our mental processes.

It should be pointed out, nevertheless, as every psychiatrist so well knows, that judgment in regard to the higher processes of thought, the finest discriminations and the most abstract ideations are difficult to evaluate in any patient. Friends and even a discerning physician, who could not be expected to pass judgment on mental qualities other than those of common observation, may regard the patient as "perfectly normal". A slight change in the ability to decide a delicate moral issue or a minor tipping of the scales of thought might still be lost in these patients with the right cerebral hemisphere removed, without being revealed by ordinary examination. It was only the most delicate form of sensory discriminations that Sir Henry Head found absent in cases of cortical damage to the sensory area. There was no loss of the coarser perceptions, such as temperature, touch and pain, but only of those finer qualities in which one had to weigh in the scales the difference between the weight of one object and another or the texture of two pieces of cloth closely alike. May it not be, therefore, that the right frontal lobe contains a similar function in regard to our highest intellectual processes?

No answer to such a question can come until prolonged observation gives some data on that elusive and highly important condition called "a change of character", so often spoken of but so difficult to define. Without minimizing in any way the importance of these physiological studies which have been carried out with great skill and which have so many implications both in the mental and physical fields, one feels that the time has not come to draw a final conclusion that the right cerebral hemisphere in man serves only such non-intellectual processes as motion and sensibility.

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3 Gardner, W. J.: Removal of the right cerebral hemisphere for infiltrating glioma. J. A. M. A. 101: 823 (Sept. 9) 1933.

THE COMMONHEALTH

NUMBER 3, Volume 20 of *The Commonhealth*, the quarterly bulletin of the Massachusetts State Department of Public Health, is devoted entirely to epidemiology, taking up this fascinating public health detective work by an exhaustive study of case reports. The diseases which are so considered are typhoid fever, gastro-enteritis, bacillary dysentery, streptococcic infections, smallpox, tuberculosis, gonorrhea and syphilis, chronic disease and dental caries. In the case of gastro-enteritis, several instances show how mild carbon monoxide poisoning may simulate food poisoning.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

HUNT, ERNEST L. M.D. Harvard University Medical School 1902. F.A.C.S. Director, Division of Surgery, Worcester City Hospital 1919-March 1933. Consulting Surgeon, Worcester City, Worcester State, Holden District, U. S. Veterans' Hospital at Rutland Heights, Harrington Memorial Hospital, Southbridge, and Worcester County Sanatorium. His subject is "Some Further Observations Upon Contamination of Operative Wounds by Air-Borne Bacteria." Page 931. Address: 28 Pleasant Street, Worcester, Mass.

ELLIS, LAURENCE B. A.B., M.D. Harvard University Medical School 1926. Assistant Physician, Thorndike Memorial Laboratory and Junior Visiting Physician at the Boston City Hospital. Assistant in Medicine, Harvard Medical School. Address: 319 Longwood Avenue, Boston. Associated with him is

HALL, FRANCIS COOLEY. Litt.B., M.D. Harvard University Medical School 1917. Instructor in Medicine, Harvard Medical School. Research Fellow in Medicine, Thorndike Memorial Laboratory, Boston City Hospital. Address: 372 Marlborough Street, Boston. Their subject is "Chronic Hereditary Edema (Milroy's Disease): Its Clinical Aspects and the Nature of Its Production." Page 934.

HOMANS, JOHN. M.D. Harvard University Medical School 1903. F.A.C.S. Surgeon to the Peter Bent Brigham Hospital, Boston. Assistant Professor of Surgery, Harvard Medical School. His subject is "Edema of the Legs Due to Local Causes." Page 939. Address: 721 Huntington Avenue, Boston.

MINER, LEROY M. S. Honorary Doctor of Science, D.M.D. Harvard University Dental School, 1904. M.D. Boston University School of Medicine 1907. F.A.C.S. Professor of Clinical Oral Surgery, Harvard University. Dean, Harvard University Dental School. Associate Professor of Stomatology, Boston University. Trustee, Oral Surgeon, and Chief of Department of Surgery, Forsyth Dental Infirmary for Children. Oral Surgeon and Chief of Dental Staff, Massachusetts General Hospital. Oral Surgeon and Chief of the Oral Surgical Service, Massachusetts Memorial Hospitals. Consulting Oral Surgeon, Newton Hospital and Melrose Hospital. His subject is "The Dentists' Achievement in the Discovery and Development of Anaesthesia." Page 945. Address: Harvard University Dental School, 188 Longwood Avenue, Boston.

NISSEN, H. ARCHIBALD. A.B., M.D. Harvard University Medical School 1916. Assistant Physician, Robert B. Brigham Hospital. Member of the Staff and Visiting Physician, New England Deaconess Hospital. Assistant Physician, Palmer Memorial Hospital. Former Instructor in Medicine, Harvard Medical School. His subject is "The Robert Brigham Hospital Survey of Chronic Disease." Page 951. Address: 205 Beacon Street, Boston.

HAMILTON, BURTON E. A.B., M.D. Harvard University Medical School 1910. Cardiologist, Boston Lying-In Hospital. Consultant in Cardiology, New England Deaconess and Palmer Memorial Hospitals, Choate Memorial Hospital, Woburn and Robert B. Brigham Hospital, Boston. Consultant in Internal Medicine, Melrose and Malden Hospitals. Research Fellow, Thorndike Memorial, Assistant in Medicine, Boston City Hospital. Instructor in Courses for Graduates, Harvard Medical School. Address: 319 Longwood Avenue, Boston. Associated with him is

STEWART, C. C. JR. A.B., M.S., M.D. University of Pennsylvania Medical School 1926. Member of the Staff of the Mary Hitchcock Memorial Hospital, Hanover, N. H. Address: Hanover, New Hampshire. Their subject is "Four Living Adults with Coaretation of the Aorta." Page 958.

SWEET, RICHARD H. M.D. Harvard University Medical School 1926. Surgeon to Out-Patients, Palmer Memorial Hospital. Assistant in Surgery, Massachusetts General Hospital. Consulting Surgeon Channing Home. His subject is "A Periosteal Elevator for the First Rib." Page 960. Address: 205 Beacon Street, Boston.

MISCELLANY

A TRIBUTE TO DR. HENRY PICKERING WALCOTT

By X. Henry Goodnough

Dr. Henry Pickering Walcott, after a life of most distinguished public service, died at Cambridge, November 11, 1932, in the ninety-fourth year of his age.

To his leadership more than any other has been due the great improvement in public health and welfare which has taken place during the last half century. Of all his public services his work as chairman of the State Board of Health probably produced the most striking and far-reaching results. After graduating from Harvard and obtaining his medical degree, which he took finally at Bowdoin in order to enable him to enter the Army more promptly, he studied for a time abroad and later engaged for several years in the private practice of his profession at Cambridge. In 1881 he was appointed Health Officer of the then State Board of Health and two years later became a member of the board.

Slight, indeed, as compared with the present day, was the interest taken in public health and public welfare in their larger aspects, when Dr. Walcott first became connected with the State Board of Health, after a term as chairman of the Board of Health of Cambridge. Very little adequate thought or careful study was then being given to the prevention of communicable disease, to the protection of the purity of water supplies and inland waters, or to the improvement of the surroundings in which large numbers of people dwelt. Complaints had arisen from time to time of objectionable sanitary conditions in certain sections of the state and these were then being dealt with by the appointment of special investigating commissions composed usually of able men who were variously qualified for the solution of such problems but commonly handicapped either by the lack of expert knowledge or of adequate funds for the purpose.

In 1886 under Dr. Walcott's inspiration the State Board of Health was reorganized as a separate board with much greater powers than had been granted to the previous Board of Health, Lunacy and Charity. These additional powers included the oversight and care of public water supplies and the protection of the purity of inland waters, while in addition the board was required to advise cities, towns, manufacturers and others, as to their plans for water supply, drainage or sewerage and to make all practical efforts to relieve the vitiation of streams. Dr. Walcott was appointed chairman of the reorganized board at the practically unanimous request of the physicians of the State, and under his guidance practical scientists were selected to study the problems presented and careful experimental studies were instituted to form the basis of the action of the board upon matters submitted for its consideration.

The enactment of this legislation was a new departure in governmental regulation over matters which had hitherto remained solely under the control of local authorities and marks the beginning of a new era in public health administration. The legislation was so devised as to avoid the appearance of an infringement upon local self-government, always so jealously guarded by the municipalities of the State, by providing that the board should be clothed only with advisory as distinguished from mandatory powers, with no requirement that its advice should be accepted and no penalty in case of rejection. In his own words, "the decisions of the board must look for their sanction to their own intrinsic sense and soundness".

The work which was carried on under his direction quickly commended itself to public confidence, and the extraordinary wisdom of his course was shown by the fact that, in spite of the absence of any mandatory powers or of any penalties for the neglect of its recommendations, the decisions of the board were practically invariably accepted although occasionally only after considerable opposition.

Soon after the board was established the pressing question of devising a practicable and satisfactory plan for the collection and disposal of the sewage of the numerous independent municipalities surrounding the City of Boston was submitted for the consideration of the board. After thorough study under Dr. Walcott's guidance a plan was selected which required an estimated expenditure of $5,000,000, a large sum at that time (1889) for what was essentially a health measure. In order to carry out this most important improvement which involved many municipalities, a new agency became necessary and this requirement was met by the creation of a Metropolitan Sewerage district to be administered by a special commission known as the Metropolitan Sewerage Commission. The plan was immediately accepted and adopted by the legislature and the works built in accordance with that plan have served the district admirably ever since.

One of the greatest improvements ever effected in living conditions in the most densely populated area of the State was the creation of the Charles River Basin which lies near the center of the Metropolitan district. Comparatively few of the present inhabitants can remember the repulsive appearance and offensive odor of the foul banks and flats of this estuary which rendered it obnoxious at every low tide. Plans for its improvement had been talked of for many years and due to Dr. Walcott's initiative a committee was formed, of which he was the chairman, which prepared a plan for a dam in the river near Craigie Bridge so arranged as to maintain the water in the Basin

and in the river above it for a distance of nearly ten miles at a constant elevation somewhat below the level of high tide. The report was presented to the legislature in 1894 but the plan was strenuously opposed by certain residents along the shore of the Basin in the City of Boston who succeeded for a time in postponing its adoption, but by persistent and continued effort under his guidance it was at last finally accepted and in the form in which it was first proposed.

The construction of the Charles River Basin transformed that offensive tidal estuary into a great basin of fresh water maintained at a constant level and improved enormously the sanitary conditions in the region about it. Not the least of these improvements was the opportunity afforded for the more effective drainage of the low grounds in its neighborhood where the outlets of drainage channels were formerly obstructed and large areas of adjacent land overflowed at times of high tide. An enormous improvement has been effected in the character of the surroundings of the basin and its construction has resulted in the creation of one of the most beautiful water parks to be found in any great city in the world. After its completion some of his most prominent and most powerful opponents acknowledged to Dr. Walcott personally that in the whole matter he had been right and they had been wrong, and all came to recognize that it was to his initiative and his energetic and long-continued efforts that this great improvement was due.

Far greater in magnitude was the plan for a Metropolitan water supply for Boston and its suburbs. During the last quarter of the Nineteenth Century the various cities and towns lying about the City of Boston, acting for the most part independently, had introduced public water supplies from local or nearby sources. With the growth of this region in population the demand for water constantly increased while at the same time areas from which suitable additional supplies might have been obtained had become populated and were no longer available for that purpose. It was impracticable for most, if not all, of these towns separately to secure proper sources of water supply by going farther afield on account of prohibitive cost, and ultimately the whole question was submitted by the legislature to the State Board of Health with instructions to report a plan for a Metropolitan water supply to provide for all municipalities within ten miles of the State House. Many sources were considered, some of them beyond the limits of the State, prominent among them being the Merrimack River the water of which, although badly polluted, could have been purified and brought to the district at less cost than unpolluted water from the Nashua River, the source finally selected. The plan to use the polluted water of the Merrimack River was rejected notwithstanding its lower cost, and in recommending the Nashua River instead Dr. Walcott in his report stated: "The very great merit of the plan now submitted is to be found in the fact that this extension . . . to the Valley of the Nashua River will settle forever the future water policy of the district, for a comparatively inexpensive conduit can be constructed through to the Valley of the Ware River and beyond the Ware River lies the Valley of the Swift; and in a future so far distant that we do not venture to give a date to it, are portions of the Westfield and Deerfield Rivers, capable when united, of furnishing a supply of the best water for a municipality larger than any now found in the world." The plan was adopted when presented to the legislature in 1895 and his unerring judgment gave him a glimpse into a distant future, for when a further additional water supply for the Metropolitan district became necessary, thirty years later, his suggestion was followed and works for extension to the Ware and Swift Rivers are now (1932) under construction.

Soon after the acceptance by the legislature of the plan for a Metropolitan water supply Dr. Walcott was appointed a member of the Metropolitan Water Board created by the legislature to construct and operate the works and subsequently became its chairman. As was always the case in organizations with which he became connected, he was the leading spirit in carrying out the work. The construction of these works cost somewhat more than $40,000,000. Included among them was the great Wachusett Reservoir, involving the removal from the site of two villages, many farm houses and factories and two large cemeteries. In order to protect and preserve the quality of the water the surface soil was removed from the site, swamps which might affect the quality of the water were drained and a large area of land acquired all about the reservoir. Since the completion of these works the district has been supplied at all times with water of excellent quality and for more than thirty years has had an ample supply for all its requirements.

Besides these great improvements he initiated or supervised many others of less magnitude, but of much importance to the cities and towns of the State, and aided in securing improvements in water supplies and sewerage systems and in carrying out projects for relieving the pollution of rivers and streams.

Of the greatest importance among the things he accomplished in protecting the public health and relieving human misery was his success in securing the manufacture and free distribution of diphtheria antitoxin to the inhabitants of the State. Antitoxin, when first introduced, was made by private agencies and distributed through drug stores at a cost which almost prohibited its use by poor families. He obtained a small appropriation from the State and secured the coöperation of Harvard University and thus was enabled to estab-

lish a small laboratory to begin its manufacture. The work was placed in charge of Dr. Theobald Smith, an investigator who had attained eminence in similar work. As soon as it was demonstrated that the work could be successfully carried on at a very reasonable cost, he sought to secure from the legislature an adequate appropriation for its continuance. In this he was opposed by commercial interests who succeeded in causing the appropriation to be rejected by the legislature. Upon this the members of the board proposed to subscribe the needed amount, but by an appeal to the State government and with the coöperation of Harvard University the necessary funds were secured to carry on the work for that year and by the following year the opposition had been completely overcome. The work has been carried on to the present day with constant improvement in the quality of material and has resulted in the saving of many thousands of lives.

One of the outstanding accomplishments of Dr. Walcott's busy life was in association with Dr. S. H. Durgin in the organization of the Massachusetts State Association of Boards of Health, which has continued to carry on efficiently, reflecting the spirit of these two public health officials.

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1932 AND SEVEN YEAR AVERAGE

MONTH ENDING OCTOBER 14, 1933

Diseases	1933 Week ending Sept. 23	1933 Week ending Sept. 30	1933 Week ending Oct. 7	1933 Week ending Oct. 14	Average cases reported for week corresponding to Oct. 14 for past seven years	1932 Week ending Sept. 24	1932 Week ending Oct. 1	1932 Week ending Oct. 8	1932 Week ending Oct. 15
Cerebrospinal Men.	1	—	—	—	—	—	—	—	—
Chicken Pox	9	15	35	24	31	5	5	27	33
Diphtheria	1	4	—	3	17	3	5	—	2
Dysentery Amebic	—	—	3	—	—	—	1	—	—
Dysentery Bacillary	—	—	—	1	—	2	—	—	—
Encephalitis Epid.	1	—	1	—	—	—	—	1	—
German Measles	—	1	—	—	1	—	—	—	—
Hookworm Infection	—	—	—	—	—	—	—	—	1
Influenza	1	1	—	2	3	3	—	5	2
Malaria	1	1	—	—	—	—	—	—	—
Measles	4	1	5	4	11	1	2	5	4
Mumps	8	18	36	27	11	4	13	9	23
Paratyphoid Fever	—	—	—	—	1	4	—	—	—
Pneumonia (Broncho)	9	12	13	15	13	15	13	23	22
Pneumonia (Lobar)	3	16	13	22	18	15	11	16	19
Poliomyelitis	10	7	5	2	8	—	1	—	1
Scarlet Fever	15	26	26	39	19	20	18	38	27
Septic Sore Throat	2	4	1	1	3	—	—	1	1
Tetanus	—	—	—	2	—	1	—	—	—
Tuberculosis (Pul.)	20	26	19	15	26	20	12	26	21
Tuberculosis (O. F.)	2	2	3	1	5	5	1	2	2
Typhoid Fever	4	1	2	2	5	5	8	3	2
Typhus Fever	—	—	—	—	—	—	—	—	1
Undulant Fever	1	—	—	2	—	—	—	—	—
Whooping Cough	19	39	14	23	30	35	41	17	34
Gonorrhea	30	37	30	15	31	31	28	41	20
Syphilis	34	48	44	28	33	35	36	50	35

Remarks: No cases of Asiatic cholera, glanders, plague, or yellow fever during the past seven years.

A COMMITTEE TO VISIT THE STILLMAN INFIRMARY AND UNIVERSITY CLINIC

Announcement was made November 1 at Harvard University that the Board of Overseers had created a new Visiting Committee to visit the Stillman Infirmary and University Clinic. The new group brings to a total of 52 the Visiting Committees selected by the Board of Overseers to keep divisions and departments of the University in ac-

tive communication with interested authorities throughout the country.

The Stillman Infirmary was built in 1901 to serve as a hospital for members of the University. More recently a Department of Hygiene was established at Harvard, which maintains several Medical Advisers and Clinics for students and employes of the University. The action of the Board of Overseers in naming a Visiting Committee to advise and assist in this work is regarded as an indication of its increasing importance.

Members of the Overseers' Committee to visit the Stillman Infirmary and University Clinic include physicians from Boston, New York and Philadelphia. Chairman of the committee is Dr. Daniel F. Jones, 1892, of Boston, surgeon-in-chief at the Palmer Memorial Hospital. The remaining members follow: Dr. George H. Bigelow, 1913, of Boston, a member of the staff at the Massachusetts General Hospital; Dr. Eugene F. Dubois, 1903, of New York City, Professor of Medicine at the Cornell Medical College; Dr. Channing Frothingham, 1902, of Boston, Physician-in-charge at the Faulkner Hospital; Henry S. Grew, 1896, of Boston; Dr. Edward B. Krumbhaar, 1903, of Philadelphia, Professor of Pathology at the University of Pennsylvania; and Dr. Ernest G. Stillman, 1908, of New York City.

The personnel of the Overseers' Visiting Committees for other medical departments of the University was also announced. The committee for the Harvard Medical School continues without change from last year. That for the School of Public Health includes one new member, Dr. Henry Dexter Chadwick, of Boston, a pioneer in the investigation of tuberculosis, and originator of the Chadwick Clinics in Massachusetts for the examination of school children.

For the Harvard Dental School, four new members have been appointed. They are Robert K. Cassatt, 1895, Percy H. Clark, 1896, and Frank G. Thomson, 1897, all of Philadelphia, and George C. Cutler, 1913, of New York City. The one new member on the committee for Health and Athletic Sports is Henry S. Faxon of Boston.

ALVARENGA PRIZE OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

The College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, being the income for one year of the bequest of the late Señor Alvarenga, and amounting to about Three Hundred Dollars, will be made on July 14, 1934, provided that an essay deemed by the Committee of Award to be worthy of the Prize shall have been offered.

An essay intended for competition may be upon any subject in Medicine, but must be accompanied by a written assurance from the author that it has not appeared previously in print, either in whole or in part, in any form, and has not been presented elsewhere in competition for a prize. The essay should represent an addition to the knowledge and understanding of the subject based either upon original or literary research. It must be typewritten, and in English acceptable for publication without necessity for editing by the Committee. Any illustrations should be appropriate and correctly annotated with the text. Essays must be received by the Secretary of the College on or before May 1, 1934.

Each essay must be sent without signature, but must be plainly marked with a motto and be accompanied by a sealed envelop having on its outside the motto of the paper and within the name and address of the author.

It is a condition of competition that the successful essay or a copy of it shall remain in possession of the College; and that it may be published by the author with the consent of the College; other essays will be returned upon application within three months after the award.

The Alvarenga Prize for 1933 has been awarded to Drs. Harry Shay and J. Gershon Cohen of Philadelphia for their Essay entitled: "Experimental Studies in Gastric Physiology in Man."

JOHN H. GIRVIN, *Secretary*,
19 South 22D Street, Philadelphia, Pa.,

CORRESPONDENCE

COMMENTS ON TRANSMISSION OF SOUND THROUGH BONY STRUCTURES

September 28, 1933.

Editor, *New England Journal of Medicine*,

In your editorial, "The Deaf in the United States" of September 21, you stated "if the auditory nerve is not impaired, sound may be transmitted through the bony structures by specially contrived agencies". You further stated that "the range of hearing may often be increased through practice".

It may interest you to know if for no other reason than the historical side that a physician specializing in ear, nose, and throat, who is interested in the problems of "hard of hearing" and who was trying to find a way of giving hearing to the deaf, when all other therapeutic means have failed, was the first one to utilize the bone conduction route, mastoid and zygoma, and devised an apparatus for the transmission of sound and spoken word in the manner which has since been employed basically and wholly by different concerns.

While the whole idea and method appear perfectly simple now, a great deal of skepticism, even opposition, has been encountered, in and out of the profession in the early days of the invention. Men of vision, however, visualized its possibility.

Dr. Prenn of Boston communicated the idea first to the late Professor Derr, of the Institute of Technology, back in 1918 or 1919, who encouraged him to go ahead with it. The idea occurred to him while he was working on the construction and

experimentation of the Hearing Test apparatus (Boston M. & S. J. and Progressive Medicine). The late Dr. Steinmetz saw the logic of it and offered to help along with the construction of a suitable portable transmitter. The apparatus was shown and a few remarks were made at the convention of the American College of Surgeons before the Section of Otology held in Boston (1928).

It has been demonstrated before the New England Otological Society (1929).

A paper on this subject was submitted to the Boylston Medical Committee of Harvard University in 1921 and to the Alvarenga in 1920.

A record for the systematic reëducation of hearing has also been devised.

A more elaborate paper was read before the Ear, Nose and Throat Section at the Congress of Physical Therapy in September, 1932.

JOSEPH PRENN.

483 Beacon Street,
Boston, Mass.

MEDICINE IN SOVIET RUSSIA

Editor, *New England Journal of Medicine*,

I read with much interest the editorial entitled "Medicine in Soviet Russia" which appeared in the August 3 issue of the *New England Journal of Medicine*. I was tempted to write you about it, for the impression conveyed by Sir James Purves-Stewart's little book, upon which your editorial was based, was so at variance with the impression which Soviet medicine made on Sir Arthur Newsholme and me in the course of our visit which almost coincided in point both of time and place with Purves-Stewart's tour. I decided, however, to defer my letter until I could have an opportunity to read Sir James' book.

A few weeks ago, I received a copy of the book from the editor of the *Survey*, with a request that I write a brief review of it, which, I believe, will appear in the next mid-monthly issue. In the review I was limited to a few hundred words. Therefore, I am venturing to send you copy of my first draft before it was boiled down. Even that, I felt, was too brief to do justice to the subject, to Sir James, or to myself.

Within a month, Doubleday, Doran and Company will announce the publication of a book on which Sir Arthur Newsholme and I have been collaborating during the past year, under the title "Red Medicine: The Health of the People in Soviet Russia." I shall take pleasure in sending you a copy of the book with our compliments.

I know that you will appreciate that Sir Arthur, like Sir James, is a keen observer. What he says I am sure will command the respect of the medical profession, although they may find it difficult to accept some of our conclusions. Sir Arthur was certainly no more sympathetic to the great Soviet experiment than Sir James Purves-Stewart was, but I feel that he approached it with the more open mind. Personally, I knew next to nothing about the Soviet system. I approached it with great curiosity and certainly more sympathetically than Sir Arthur. However, we have not had any serious difficulties in harmonizing our views.

Sir Arthur and I cannot agree with Sir James that medicine in the Soviet Union is practiced without incentive or inspiration. The testimony to the contrary was almost unanimous, even among physicians who had practiced under the old régime. I find it very difficult to understand how Sir James could have failed to find evidence of research worthy of the name. To be sure, he does not mention having visited the laboratories of Pavlov or Orbeli in Leningrad, the Serbsky Institute in Moscow, or the great Institute of Roentgenology in Kharkov, or the Institute for Tuberculosis in Tiflis, or the cardiac institutes in the Crimea. Sir Arthur gained the impression that a high order of research was being carried on in these and many other similar institutes which it was our privilege to visit.

A letter received a few days ago from Dr. Welch, who is, unhappily, as you know, in the hospital at Johns Hopkins, tells me that Dr. Adolf Meyer, who has just returned from an extensive visit to Russia whither he went in response to an invitation to deliver a course of lectures on psycho-biology at the Institute in Kharkov, is just as enthusiastic about what he saw as Sir James and I are, especially in the field of research.

Most of the institutions dealing with preventive medicine and public health enumerated in the second paragraph of your editorial are really doing quite extraordinary work, which you will find quite fully described in our book. It is true that many doctors must live in two or three rooms, but they are better off in this respect than most people in the Soviet Union. Overcrowding is terrific in the cities, due to the vast development of heavy industry and the migration of upwards of twenty millions of peasants to the cities. Housing, like food, has been rationed as in war, for the fact is Russia has not yet fully emerged from her great revolution.

Comparatively speaking, I could not agree that doctors in general are poorly paid. They are not the highest paid class. Writers and engineers are more highly paid than doctors, but the doctors have recently had an increase. Moreover, it is very difficult to determine just what the remuneration of different classes is, for all remuneration is of two types—the individual wage and the social wage. As regards the social wage, the doctor fares much better than many other professions and occupations. Also, his hours are short, from four to six; and he is entitled to spend additional time either in the laboratory or at clinics, for which he receives full additional salary. The fact is, many doctors informed us that they had more money

than they could spend. It is quite incorrect to say that no physician can accept any reward for services outside his regular routine. Not only may he accept additional assignments to public service, but he is entirely at liberty to accept fees for consultation; and some of the professors we met testified that these fees were not inconsiderable.

In view of our common interests in the costs of medical care, I felt sure that you would be interested in my comment on the editorial concerning Sir James Purves-Stewart's book, and that you would be equally interested in knowing of the forthcoming book growing out of the trip which Sir Arthur Newsholme and I made last summer and autumn.

Sincerely yours,

JOHN A. KINGSBURY.

40 Wall Street, New York, N. Y.

RECENT DEATHS

O'BRIEN—JOHN FRANCIS O'BRIEN, M.D., of Mattapan (Boston) died in Providence, Rhode Island, October 27, 1933. He was born in Charlestown, Massachusetts, in 1867 where he resided until three years ago. His premedical education was acquired at Boston College. His M.D. degree was taken from the Harvard University Medical School in 1892.

After studying at the Rotunda, Dublin, Ireland, and the University of Vienna, he engaged in practice in Boston and served as medical inspector in Boston public schools, and trustee of the Boston Consumptive Hospital, having been chairman of that board for many years. He was Assistant Superintendent of the Boston City Hospital at the time of his death, and in charge of the sanitarium division at Mattapan. He was chief of the staff at the St. Elizabeth's Hospital before assuming his duties at the City Hospital.

Three years ago Pope Pius XI appointed Dr. O'Brien as Knight of the Holy Sepulchre, and Boston College bestowed on him an honorary LL.D. degree.

Dr. O'Brien joined the Massachusetts Medical Society in 1903, and he was also a Fellow of the American Medical Association. He was a member of the University Club, the Clover Club, the Charitable Irish Society, Knights of Columbus, and the Foresters.

He is survived by a daughter, Miss Mary O'Brien, and a brother, William P. O'Brien of Jamaica Plain.

LORING — ROBERT PEARMAIN LORING, M.D., of Newton Centre, Massachusetts, died at his home October 28, 1933. He was born in Chelsea, Massachusetts, in 1852, the son of Joshua Loring, President of the Blackstone National Bank.

Dr. Loring took his M.D. degree from Harvard University Medical School in 1875, and conducted a medical practice for thirty-five years in Newton, Massachusetts. He was an original member of the staff of the Newton Hospital. He joined the Massachusetts Medical Society in 1876, and retired in 1917.

He is survived by his widow, Adelaide Nason Loring, formerly of Kennebunk, Maine; a son, Joshua Loring of Natick, and two daughters, Mrs. Henry E. Ohler of Newton Centre, and Mrs. Raymond Paton of Hingham, Massachusetts.

OBITUARIES

ALEXANDER QUACKENBOSS, M.D.

Dr. Alexander Quackenboss whose death on October 27, 1933, was noted in last week's issue, was one of the leading ophthalmic surgeons of this country. His life was noteworthy for his faithful work, his kindness, his charity, and his devotion to the higher things of life. He had many firm friends. His intimates had the highest respect and affection for him, and all who knew him admired him.

He was born in Worcester, 67 years ago, the son of Abram and Fanny Quackenboss. His father was the superintendent of the Worcester and Providence Railroad. He was one of three brothers, only one of whom survives. He was prepared for college in a private school. He attended Dartmouth, where he distinguished himself in scholarship and athletics. He played third base, and in his senior year, was captain of the Dartmouth baseball team. On graduation from Dartmouth he entered the Harvard Medical School, where he took a high standing in scholarship and for two years played third base on the Harvard baseball team. An injury resulting from an accident due to a runaway horse, from which he suffered concussion of the brain, prevented his continuing longer on the baseball team.

In 1891 and 1892 he served as medical house officer at the Boston City Hospital. He then became a house officer at the Eye and Ear Infirmary where the high character of his work soon attracted the attention of his seniors on the staff. He became surgeon to out-patients and assistant to Dr. Oliver Wadsworth immediately after his graduation. He was promoted rapidly and in a few years became visiting surgeon and served in this capacity until 1926 when he retired as Surgeon Emeritus. He was Williams Professor of Ophthalmology at the Harvard Medical School until his retirement as Professor Emeritus in 1926. He had thus completed thirty-three years of continuous service at the Eye and Ear Infirmary. From 1904 to 1914 he was professor of Ophthalmology at the Dartmouth Medical School. His surgery, as everything else he did, was characterized by exceptional skill, method, faithfulness, and devotion to his patients. Those who have, as has the writer, been under his care in a serious crisis, can never forget the continuous attention and intelligent interest which he gave so freely.

All his life he devoted himself as faithfully to the poor and even to those who could pay him nothing, as to those in better circumstances. His charities were many and known only to himself and the recipients.

On January 9, 1894, he married Sophia Delano, who survives him. His married life of thirty-nine years was most happy. He made one or two trips to England to attend ophthalmologic meetings and during the war went abroad in the summer of 1915 with the Harvard unit organized by Dr. E. H. Nichols and served at Dannes-Camiers. Later in 1918, he served at Camp Wheeler in Georgia at Base Hospital, No. 51, which went to France on July 18, 1918. With this unit he served at Tours and elsewhere until the end of the war. He was retired with the rank of major. His work in the army was characterized by devotion, courage, and good judgment, as was all his other work. He contributed many articles to the literature of his profession, all characterized by thoroughness and good sense. He bore with exemplary fortitude the long illness which finally resulted in his death.

Such is a brief and inadequate account of the life of a man who left an enviable reputation, the deep affection of many friends, and the respect of all who had come in contact with him.

F. B. L.

JOHN EDWARD LANE, M.D.

Dr. John Edward Lane was born in Whately, Massachusetts, on February 12, 1872. He was the son of a minister, John William Lane, a native of New Hampshire, and his wife Mary Haynes, who was born in Townsend, Massachusetts. He was a typical product of New England. As a boy he went to Hopkins Academy at Hadley, Massachusetts, where he graduated in 1889, spent one year at Phillips Andover, and then went to Yale University where he received his B.A. in 1894 and his M.A. in 1897. After spending some time abroad in study he returned to this country and entered the Yale Medical School, receiving his M.D. in 1903. He served an interneship in the Bridgeport General Hospital and entered general practice in New Haven in 1906. In 1910 he moved to Yakima, Washington, where he was in general practice for three years, acting during this period as County Physician, and Chairman of the Tuberculosis Committee of the Washington State Medical Association. During the latter half of 1913 and all of 1914 he studied dermatology in Paris and Berlin. He returned to New Haven in 1915 and opened an office as dermatologist, which specialty he continued to practice successfully for the remainder of his life.

He served as Assistant, Instructor and Clinical Professor of Dermatology in the Yale Medical School, and finally became Consulting Dermatologist to the New Haven Hospital. The esteem in which he was held by his dermatological brethren is shown by the fact that he was elected a member of the New York Dermatological Association, which involved the extension of the limits of greater New York more than ever previously. He was a member of the American Dermatological Association and an Honorary Member of the New England Dermatological Society, and was also active in the American Medical Association in connection with the work of the Scientific Exhibit. The outstanding features of Dr. Lane's character were rugged honesty and sincerity which earned the respect, affection and confidence of his associates. His death was a loss not only to the local profession but to his dermatological associates and to the profession in general, for whose interests he constantly worked.

G. B.

A TRIBUTE TO DR. JEREMIAH J. CORBETT

THE BOSTON CITY HOSPITAL

Dr. Jeremiah J. Corbett, Ophthalmic Surgeon-in-Chief, died suddenly in Santa Fe, New Mexico, on August 24, 1933, while on a vacation trip. He is survived by his widow and a son.

For twenty-seven years he was associated with our hospital, beginning as an interne in 1906. He passed through all the grades in his department, becoming Ophthalmic Surgeon-in-Chief in July 1925. He also served as Surgeon-in-Chief of the Ophthalmic and Aural Services of the Malden Hospital and the Whidden Memorial Hospital of Everett.

He was born in Peabody, Massachusetts, in 1877. He graduated from Peabody High School in 1897, from St. Francis Xavier's College in 1902 and from Harvard Medical School in 1906.

His societies included the American Medical Association, Massachusetts Medical Society, American Academy of Ophthalmology and Oto-Laryngology, New England Ophthalmological Society, New England Otological and Laryngological Society and Malden Medical Society. He received his certificate from the American Board of Ophthalmic Examinations in 1925 and became a Fellow of the American College of Surgeons in 1926.

Like many busy and successful physicians, he managed to find time to serve his community, and was for eight years a member of the Malden School Board. His literary contributions were of a high order, particularly his articles dealing with the use of radium in eye diseases.

By his death, our Staff has lost a wise and learned member. He understood the hospital and its problems as only a few men have, and gave himself unsparingly to its service. His record as a keen observer, an excellent diagnostician, and a skilful surgeon was enviable. His fairness to his juniors endeared him to them all and his solicitude for patients in the hospital was inspiring. As a member of the Senior Staff he gave generously of his time in helping to solve the

various hospital problems and his wise and mature judgment was always helpful.

In extending our sympathy to his family we are mindful of the fact that there is some solace in knowing that Dr. Corbett contributed much to the health and happiness of the sufferers who passed through his hands. His associates will feel his loss keenly at the council table and in the consultation room, where his presence was always a welcome and dependable asset.

P. F. Butler, M.D., *Secretary*, Senior Staff.
October 26, 1933.

RESOLUTIONS ADOPTED BY THE STAFF OF THE LYNN HOSPITAL ON THE DEATH OF DR. HERBERT W. NEWHALL

On June 18, 1933, Dr. Herbert W. Newhall died at his residence, 83 Broad Street, Lynn, Massachusetts. He was in his seventy-fifth year and in active practice up to the time of his last illness.

The son of a former physician of Lynn, graduate of Harvard College, Harvard Medical School and house officer of the Massachusetts General Hospital, with many months of postgraduate study in Europe, Dr. Newhall took up the practice of medicine in Lynn.

To this background of medical tradition he brought a large medical ability, a devotion to duty and a progressiveness that searched out and acknowledged worth wherever he found it.

Rather stern appearing to those who did not know him well, he really possessed an unusual kindliness and a warm geniality.

He was a great lover of nature and was well acquainted with its various forms; from all of which, in his later days, he derived great pleasure and gave out much of it to his friends.

His contribution, both as a physician and a citizen, to this community in which he lived has been large; and with his passing, medicine has lost a standard bearer whom it will miss much.

We submit this to the records of the Visiting Staff of the Lynn Hospital, which he served so long and so faithfully, and to his family, for whose loss of a devoted husband and father, we extend our deepest sympathy.

Committee of the Staff,
George H. Kirkpatrick,
Elgin W. Jones.

NOTICES

RADIO HEALTH MESSAGES

November-December, 1933

Health Messages

Sponsorship: Public Education Committee of the Massachusetts Medical Society and Massachusetts Department of Public Health.

Courtesy WBZ. Fridays, 4:30 P.M.

Nov.
10 Communicable Diseases in the Schools
17 Illness and Character
24 Heart Disease in Middle Age

Dec.
1 The Cause and Treatment of Crossed Eyes
8 Infantile Paralysis
15 The Preschool Child
22 Cancer of the Intestinal Tract
29 Preventive Medicine from Your Family Physician

State House Broadcast

Sponsored by the Massachusetts Department of Public Health.

Courtesy WEEI. Fridays, 1:15 P.M.

Health Subjects of Public Interest discussed by the Division Directors of the Department.

Radio Health Forum

Queries from the public are answered under the sponsorship of the Department of Public Health.

Courtesy WEEI. Fridays, 5:00 P.M.

Questions on Health and Prevention of Disease may be sent to Radio Health Forum, State Department of Public Health, State House, Boston.

ANNOUNCEMENT

O. S. Menard, M.D., who has been with the Lahey Clinic, announces the opening of his office at 146 Chestnut Street, Springfield, Mass.

THE EDWARD K. DUNHAM LECTURES

The Faculty of Medicine of Harvard University has issued the program for the Edward K. Dunham Lectures which will be delivered at the Harvard Medical School Amphitheater, Building C. The dates and subjects are as follows:

Genetics and Pathology

Monday, November 20, "Basic conceptions. Mechanism of hereditary and sex determination. Inheritance of pathological states in man. Hereditary factors in pathology."

Wednesday, November 22, "Origin of injurious hereditary factors by mutation. Their action as revealed by illustrative cases in human pathology. Lethal factors. Pathology of twins."

Friday, November 24, "Intersexuality. X-rays and heredity. Alcohol and heredity. The tumor problem. Intermarriage and crossing. Some bearings of genetics on medical practice."

At five o'clock
At the Harvard Medical School
Amphitheater, Building C
By
Otto Lous Mohr, M.D.
Professor of Medicine, The Royal Frederiks University, Oslo

The Edward K. Dunham Lectureship

In 1923 there was founded in memory of Dr.

Edward K. Dunham (M.D., Harvard, 1886), the Edward K. Dunham Lectureship for the Promotion of the Medical Sciences. Among the useful purposes for which the Foundation was established was that of binding closer "the bonds of fellowship and understanding between students and investigators in this and foreign countries". The lecturers are chosen from "eminent investigators and teachers in one of the branches of the Medical Sciences, or of the basic Sciences which contribute towards the advance of Medical Science in the broadest sense". The lectures, which are given annually, are "free and open to the faculty and students of the Harvard Medical School and College, and all other interested professional persons who may profit by them".

CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

On Thursday, November 16, in the amphitheatre of the Peter Bent Brigham Hospital at 3:30 P.M. there will be a clinic conducted by Dr. Henry A. Christian, Hersey Professor of the Theory and Practice of Physic in the Harvard Medical School, to which physicians are cordially invited.

REMOVAL

CHARLES A. SPARROW, M.D., announces the removal of his office to 21 West Street, Worcester, Mass.

UNITED STATES CIVIL SERVICE EXAMINATION

The United States Civil Service Commission announces the following-named open competitive examination:

Assistant Psychologist

Application for the position of assistant psychologist in the U. S. Public Health Service, for duty at the U. S. Penitentiary, Leavenworth, Kans., must be on file with the Civil Service Commission at Washington, D. C., not later than November 24, 1933.

The entrance salary ranges from $2,600 to $3,100 a year, less a deduction of not to exceed 15 per cent as a measure of economy and a retirement deduction of 3½ per cent.

REPORTS AND NOTICES OF MEETINGS

FOUR COUNTY MEDICAL SOCIETY

(BERKSHIRE, FRANKLIN, HAMPDEN AND HAMPSHIRE)

The members of the Four County Medical Society were guests of the Sisters of Mercy, at the Mercy Hospital, Springfield, on Wednesday, October 25. This was the annual meeting of the Society. Members of the hospital staff offered an interesting program for the morning with exhibits by the Laboratory, X-ray, Cardiographic, Urological, Physiotherapy, Orthopedic and Dietetics Departments. From 8:30 to 10:30 the surgical staff put on a varied and rapid schedule of work; at 10:15 there was a dry clinic, with presentation of cases and, at 11:30, three papers were presented. Dr. Brace Paddock, of Pittsfield, in his paper "What We Should Tell Our Patients with an Incurable Disease" offered some sound philosophical ideas. In "The Mid-Line Tonsil," Dr. Frank Millett, of Greenfield, gave a thoughtful and conservative discussion of the bearing of borderline cases on health. The last paper was by Dr. Nelson Hatt, of Springfield, revealing some "Errors of the General Practitioner in Orthopedics," and was a charitable revelation of the more frequent and glaring mistakes, with some suggestions for their correction.

Luncheon, at which the Society members were guests of the hospital, was a truly sumptuous repast at which we were pleased to have as our guests Dr. William Robey, President of the Massachusetts Medical Society, and Dr. Thomas O'Brien, Executive-Assistant to the President, and member of the Committee on Legislation.

Dr. Robey spoke on the work of the Society, mentioning particularly the success of the courses in postgraduate instruction, and urging the Censors of the District Societies to give serious consideration to the qualifications of applicants for membership in the State Society.

Dr. O'Brien sought the coöperation of individual physicians with the Committee on Legislation. Members of this committee have learned that any legislator is influenced by a brief opinion or few words of advice from a doctor in his constituency, more than by all the tracts and orations by members of the State Society's committee.

In the election of officers of the Four County Medical Society for the year 1934, Dr. Fred Allen of Holyoke was chosen President, and Dr. Jerome Whitney, Secretary-Treasurer.

FAULKNER HOSPITAL CLINICAL MEETINGS

On Thursday afternoon, November 2, at 5:00 P.M. the regular monthly meeting was held at The Faulkner Hospital. Two interesting cases which had come to autopsy were taken up for discussion and diagnosis. The autopsy findings were then discussed by the pathologist.

One of the cases was of unusual interest in that there was an aneurysm of the wall of the left ventricle with calcification in the dilated area. The wall of the ventricle at the thinnest point could easily be seen through and yet the wall had not ruptured. In addition to this lesion there was a general enlargement of the heart and cardiac failure due to myocardial degeneration. There was no syphilis to account for the lesion in the wall of the myocardium which resulted in the aneurysm. The question was raised as to whether a coronary occlusion some years before had caused the giving way of the cardiac muscle.

The other case was one of prolonged hyperten-

sion in which an opportunity had been given to study the patient at a time when the hypertension was present and the renal function was perfect. Before death finally occurred there was marked contraction of the kidneys due to chronic progressive vascular disease. The case was of interest because it seemed quite certain that the hypertension and cardiac hypertrophy preceded by a considerable time the lesions in the kidneys. The case was also complicated by a papilloma in the bladder which at times blocked the urethral orifice but which was pushed aside by the cystoscope so that it was not diagnosed during life.

The Faulkner Hospital has decided to reorganize the payment for laboratory service so that the patients pay for what is actually done. It it also planning to offer laboratory service at a minimum rate consistent with cost to the doctors in this district for patients who do not need to be admitted to the hospital. The success of these plans will depend upon the intelligent use of the laboratory by the practitioners.

Dr. Rooney gave a very interesting talk on what the laboratory could do for the practitioners and emphasized the importance of seeing that the patient was properly prepared for special tests and the specimens collected under proper conditions. He also emphasized the importance of having the practitioner realize just what he wished to learn from the individual test.

It was a source of satisfaction to the Staff of the Hospital to find the attendance at this meeting many times larger than at the first meeting and it makes the Staff feel that there is a demand for clinical meetings of this type.

The next meeting will be held at The Faulkner Hospital at 5:00 P.M. on Thursday, December 7. In addition to the usual pathological conference on the cases which have come to autopsy during the month Drs. F. J. Cotton and Henry C. Marble will talk on "Traumatic Surgery."

MASSACHUSETTS SOCIETY OF EXAMINING PHYSICIANS

FALL MEETING AND DINNER

The Copley-Plaza, Wednesday, November 15
Meeting at 6:30 P.M.
Dinner at 7 P.M. sharp
$2.50 per plate

PAPERS

1. Dr. Soma Weiss, Boston City Hospital: "Coronary Disease."
2. Dr. Samuel A. Levine, Peter Bent Brigham Hospital: "Angina Pectoris."
3. Dr. Robert C. Cochrane, Boston City Hospital: "Surgical Aspects of Thyroidectomy for Angina Pectoris."

CADIS PHIPPS, M.D., *President*,
WM. P. COUES, M.D., *Secretary*.

SYMPOSIUM ON INDUSTRIAL SURGERY

The exactions of Industrial Surgery are everywhere causing employers, insurance companies, and accident clinics to seek the highest quality of medical service. Every specialty is feeling the demands of the serious problem of caring for industry's injured, a problem upon which close attention is being focused and the efficient solution of which, if not provided from within our profession, must come from without. Industrial surgery is in itself a specialty requiring the highest quality in training and practice.

The Boston Orthopaedic Club presents at its meeting, November 13, the following program to which all who are interested are cordially invited:

CLINIC

Amphitheatre, Building B, Harvard Medical School—4:30 to 6:30 P.M.

Demonstration of Cases:
Industrial Backs—Dr. James W. Sever.
Industrial Wrists—Dr. George W. Morse.
Industrial Tendon Ruptures—Dr. Henry C. Marble.
Industrial Shoulders—Dr. Philip D. Wilson.
Industrial Knees—Dr. Joseph H. Shortell.

DINNER

Vanderbilt Hall, Harvard Medical School—7 P.M. (regular dinner, $.65 plate).

SPEAKERS

The Industrial Surgeon—Dr. D. L. Lynch, of the New England Telephone and Telegraph Company.

The Industrial Accident Insurance Company—Dr. George L. Marston, of the American Mutual Liability Insurance Company.

The State Industrial Accident Compensation Act—Dr. Joseph A. Parks, Chairman State Industrial Accident Board.

If you are planning to attend the dinner, kindly notify the secretary, Dr. W. A. Rogers, 264 Beacon Street, Boston.

MASSACHUSETTS PHYSIOTHERAPY ASSOCIATION, INC.

The meeting of the Massachusetts Physiotherapy Association, Inc., will be held November 14 at 8:00 P.M. at the Hotel Kenmore, Boston. Dr. Frederic J. Cotton will speak on "Scoliosis."

NEW ENGLAND PHYSICAL THERAPY SOCIETY

The regular meeting of the New England Physical Therapy Society will be held in the Banquet Hall of the Hotel Victoria, 271 Dartmouth Street, Boston, at 8 o'clock in the evening of Wednesday, November 15, 1933.

This meeting will be conducted by Dr. Claude L. Payzant who is in charge of the program.

PROGRAM

The Electrocardiograph as an Aid in Cardiac Diagnosis (with motion pictures and lantern slides). William H. Robey, M.D., Boston.

Discussion: George Levene, M.D.

Council meeting at 6 P.M. Dinner at 6:30 P.M.

We are, indeed, fortunate in having Dr. Robey as the speaker for this meeting. As this is one of the outstanding programs for the year, it is hoped that all members will make a special effort to be present.

All members of the medical profession are cordially invited to be present and to participate in the discussion.

ARTHUR H. RING, M.D., *Secretary.*

MASSACHUSETTS GENERAL HOSPITAL

A Clinical Meeting of the Staff of the Massachusetts General Hospital will be held in the Moseley Memorial Building, on Thursday, November 16, 1933, at 8:15 P.M.

PROGRAM

1. Renal Calculi in Association with Certain Diseases of the Parathyroid Gland—Dr. Fletcher Colby.
2. Certain Clinical Aspects of Parathyroid Disease —Dr. Fuller Albright.
3. Surgical Treatment of Parathyroid Tumors—Dr. E. D. Churchill.

Discussion—Dr. Joseph C. Aub, Dr. Walter Bauer.

Physicians, Medical Students, Nurses and Social Workers are cordially invited.

COMMITTEE ON HOSPITAL MEETINGS.

SOUTH END MEDICAL CLUB

The next regular meeting of the South End Medical Club will be held at the office of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, November 21, 1933, at 12 noon. The speaker will be Donald S. King, M.D., Assistant Physician, Massachusetts General Hospital, in charge of the Pulmonary Clinic, and his subject will be: "Compression Treatment of Pulmonary Tuberculosis by Artificial Pneumothorax, Phrenic Nerve Operation, and Thoracoplasty." This will be illustrated with lantern slides. All physicians are cordially invited to attend. The usual luncheon will be served at 1 o'clock.

THE NEW ENGLAND HOSPITAL ASSOCIATION

The New England Hospital Association is holding its Twelfth Annual Meeting on February 16 and 17, 1934, at the University Club, Boston, Massachusetts.

A. G. ENGELBACH, M.D., *Secretary-Treasurer.*

MASSACHUSETTS SOCIETY FOR MENTAL HYGIENE

ANNUAL MEETING

The Annual Meeting of the Society will be held on Thursday, November 23, at the Twentieth Century Club, Boston, beginning with a luncheon at 1 o'clock.

We are glad to welcome this year as speakers Dr. Lawrence K. Lunt, of Valleyhead, Concord, who will talk on "The Problem of the Psychoneuroses," and Dr. Payson Smith, Massachusetts Commissioner of Education, who will speak on "Teaching Teachers Mental Hygiene."

A more detailed announcement will appear in the next issue of the Society's *Monthly Bulletin* and invitation-programs will be mailed to the readers. This advance notice is given so that you may put the date on your calendar now—November 23.

NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

The regular clinico-pathological conference of the New England Hospital for Women and Children will be held at the hospital, Dimock Street, Roxbury, on Thursday, November 16, at 8:00 P.M. with the following program: Pathological Fractures Due to Bone Cysts; Discussed by Dr. Miriam Katzeff. Fulminating Streptococcic Pneumonia in an Infant; Discussed by Dr. Rachel Hardwick. Return of Carcinoma of the Breast Thirteen Years After Radical Amputation; Discussed by Dr. Grace E. Rochford. Erythroblastosis Neonatorum; Discussed by Dr. Olga C. Leary. Dr. Elizabeth du Blois will demonstrate her mastoid casts.

ALICE H. BIGELOW, M.D., *Secretary.*

HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Van Dyke Street entrance), Tuesday evening, November 14, at 8:15 o'clock.

Presentation of Cases.

Subject: The Discovery of the Chemical Mediators of Autonomic Nerve Impulses. By Dr. Walter B. Cannon.

Medical students and physicians are cordially invited to attend.

JOHN HOMANS, M.D., *Secretary.*

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

November 9 and 16—Harvard Medical School. Lectures on "The Care of the Patient." Amphitheater C at 5 P.M. November 9—Dr. John Homans. November 16—Dr. Elliott P. Joslin.

November 10—William Harvey Society will meet at 8 P.M. in the auditorium of the Beth Israel Hospital, Boston. The speaker will be Dr. Joseph Colt Bloodgood. Subject: "Irradiation in the Treatment of Cancer."

November 13—Symposium on Industrial Surgery. See page 976.

November 14—Harvard Medical Society. See notice above.

November 14—Massachusetts Physiotherapy Association, Inc. See page 976.

November 15—The Trudeau Society will meet at 7 P.M. at the Essex County Sanatorium, Middleton. Topic for the evening, "Treatment of Pleural Effusions Complicating Artificial Pneumothorax Treatment." Presented by Dr. Olin S. Pettingill and his Staff.

November 15—New England Physical Therapy Society. See page 976.

November 15—Massachusetts Society of Examining Physicians. See page 976.

November 16—Clinic at the Peter Bent Brigham Hospital. See page 975.

November 16—Massachusetts General Hospital. See page 977.

November 16—New England Hospital for Women and Children. See page 977.

November 19, December 17, January 15—Boston Medical History Club.

Program:

November 19, 1933—Medical-Historical Pageant under direction of Dr. B. Spector.

December 17, 1933—Professor Norman E. Himes, of Colgate University, "Medical History of Contraception."

January 15, 1934—Professor Henry E. Sigerist, Director of the Institute of Medical History of Johns Hopkins University.

JAMES F. BALLARD, Secretary.

Boston Medical Library, 8 The Fenway, Boston.

November 20, 22, 24—The Edward K. Dunham Lectures. See page 974.

November 21—South End Medical Club. See page 977.

November 22—New England Obstetrical and Gynecological Society will meet in Boston. For details address the Secretary, Fred. J. Lynch, M.D., 475 Commonwealth Avenue, Boston.

November 23—Massachusetts Society for Mental Hygiene. See page 977.

November 27 - May 28—New England Heart Association. For details address the Secretary, Dr. Paul W. Emerson, 319 Longwood Avenue, Boston.

December 7—Faulkner Hospital Clinical Meetings. See page 975.

December 15 and 16—The American Board of Dermatology and Syphilology will hold oral examinations in New York City. Information may be obtained from the Secretary, Dr. C. Guy Lane, 416 Marlborough Street, Boston, Mass.

February 16 and 17—The New England Hospital Association. See page 977.

April 16-20, 1934—The American College of Physicians will hold its Eighteenth Annual Clinical Session in Chicago at the Palmer House. For information write Mr. E. R. Loveland, Executive Secretary, 133-135 South 36th Street, Philadelphia, Pa.

July 24-31, 1934—The IVth International Congress of Radiology will be held in Zurich under the presidency of Professor H. R. Schniz. General Secretary Dr. H. E. Walther, Gloriastrasse 14, Zurich.

September 4, 5, 6, 1934—International Union Against Tuberculosis will be held in Warsaw. For particulars address The National Tuberculosis Association, 450 Seventh Avenue, New York, N. Y.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH DISTRICT MEDICAL SOCIETY

Wednesday, December 6—Beverly Hospital. Clinic 5 P.M. Dinner 7 P.M. Speaker: Dr. Hans Zinsser, Harvard Medical School. Subject: Bubonic Plague.

Wednesday, January 3—Danvers State Hospital. Clinic 5 P.M. Dinner 7 P.M. Speaker: Dr. Clarence A. Bonner, Superintendent of Danvers State Hospital. Subject: Recent Experiences in Foreign Clinics.

February 7—Council Meeting, Boston.

Wednesday, March 7—Lynn Hospital. Clinic 5 P.M. Dinner 7 P.M. Speaker: Dr. Frank H. Lahey, Boston. Subject: to be announced. Film Electrocardiogram.

Wednesday, April 4—Essex Sanatorium, Middleton. Clinic 5 P.M. Dinner 7 P.M. Speaker to be announced. Subject to be announced.

Thursday, May 3—Censors' Meeting, at Salem Hospital, 3:30 P.M.

Tuesday, May 8—Annual Meeting. Salem Country Club, Forrest Street, Peabody. Dinner at 7. Speaker to be announced. Subject to be announced.

RALPH E. STONE, M.D., Secretary.

221 Cabot Street, Beverly, Mass.

FRANKLIN DISTRICT MEDICAL SOCIETY

Meetings will be held on the second Tuesday of November, January, March and May at the Weldon Hotel, Greenfield, at 11 A.M.

CHARLES MOLINE, M.D., Secretary.

Sunderland, Mass.

MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

Meetings will take place on January 10 at Melrose; March (2nd Wednesday) at Wakefield, and May (2nd Wednesday) at Winchester.

ALLAN R. CUNNINGHAM, M.D., Secretary.

76 Church Street, Winchester, Mass.

MIDDLESEX NORTH DISTRICT MEDICAL SOCIETY

Meetings will be held on January 31, and April 25 (Annual Meeting).

T. A. STAMAS, M.D., Secretary.

226 Central Street, Lowell, Mass.

NORFOLK DISTRICT MEDICAL SOCIETY

November 28—Roxbury Masonic Temple, 8 P.M. Pneumonia Symposium, in charge of Dr. Frederick T. Lord.

January 28—Tentatively Roxbury Masonic Temple, 8 P.M. Continuance of Symposium on Diseases of the Blood. Dr. Dameshek and Dr. Straus.

February 27—Place, time, subject, and speaker to be announced.

March 27—Place and time to be announced. Dr. Edward A. Edwards and Dr. Henry H. Faxon. Symposium on the Treatment of Varicose Veins.

May—Annual Meeting. Place, time and program to be announced.

FRANK S. CRUICKSHANK, M.D., Secretary.

1695 Beacon Street, Brookline, Mass.

NORFOLK S[illegible]H DISTRICT MEDICAL SOCIETY

December 7—[illegible]oon at Quincy City Hospital. Program by the hospita[illegible]

January 4—[illegible] at Norfolk County Hospital. Speaker to be annou[illegible].

February 1—[illegible]oon at Norfolk County Hospital. Stated Meeting. Speaker: Dr. Sara Jordan. Subject: Stomach Ulcers.

March 1—12 [illegible]oon at Quincy City Hospital. Program by the hospital staff.

April 5—12 noon at Norfolk County Hospital. Speaker: Dr. Elliott P. Joslin. Subject: Diabetes.

May 3—12 noon at Norfolk County Hospital. Annual Meeting. Election of Officers.

N. R. PILLSBURY, M.D., Secretary.

Norfolk County Hospital, South Braintree, Mass.

SUFFOLK DISTRICT MEDICAL SOCIETY

November 29—Clinical Program at the Beth Israel Hospital.

January 31—General Meeting in association with the Boston Medical Library and the Trudeau Society. Speaker: Dr. Lawrason Brown of Saranac Lake.

March 28—Clinical Meeting at the Massachusetts Memorial Hospitals.

April 25—Annual Meeting at the Boston Medical Library. Election of Officers. Scientific Program, titles and speakers to be announced.

The Medical Profession is cordially invited to attend all of these meetings.

JAMES H. MEANS, M.D., Vice-President.
GEORGE P. REYNOLDS, M.D., Secretary.
311 Beacon Street, Boston, Mass.
ALEXANDER S. BEGG, M.D.,
Boston Medical Library.

WORCESTER DISTRICT MEDICAL SOCIETY

All meetings to be held on Wednesdays as follows:

December 13—Dinner and scientific program at St. Vincent Hospital, Worcester, Mass.

January 10—Dinner and scientific program at the Worcester City Hospital, Worcester, Mass.

February 14—Dinner and scientific program at the Worcester State Hospital, Worcester, Mass.

March 14—Dinner and scientific program at the Memorial Hospital, Worcester, Mass.

April 11—Open date.

May 9—Annual Meeting. Time and place to be announced later.

ERWIN C. MILLER, M.D., Secretary.

27 Elm Street, Worcester, Mass.